Rock Products

TRADEPRESS PUBLISHING CORPORATION
542 SOUTH DEARBORN STREET
CHICAGO

NATHAN C. ROCKWOOD, Editor CHAS. H. FULLER, Manager C. F. TREFZ, Associate Editor

Vol. XXIII, No. 1 January 3, 1920

Printing of this issue, 4,000 copies

Second class entry at U. S. Post Office.

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PUBLISHED EVERY OTHER SATURDAY by the Tradepress Publishing Corporation, 542 South Dearborn St., Chicago, Ill., U. S. A. W. D. Callender, president; T. J. Sullivan, vice-president; George P. Miller, Treas.; C. H. Fuller, Secy.

SUBSCRIPTION

$2 a year in United States; $3 a year, Canada and foreign. Single copies, 20 cents. Date on wrappers indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

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Looking Backward Over the Decade Just Passed at the Development of Big Hole Drilling and Blasting

Ten years ago the Big Hole Method of Drilling and Blasting had just about reached the tooth-cutting age. Beginning as an experiment some years before, the skepticism that had attended the pioneer installations had gradually worn off after it had been proven that the use of drilling equipment of the proper size and weight and a careful study of blasting methods, had resulted in the cheapest crushed stone ever produced.

The trouble in the early days of the application of this new system of quarry operation had been due in a great measure to ignorance of the fundamentals of the new system both on the part of drill manufacturers and quarry operators. Little, light outfits were installed, which, while they would drill holes, were nevertheless a long time at it.

In Big Blast hole drilling more hole is made by the heavy crushing action of the tools than by the cutting action of the drill bit, and the faster these tools are operated, the greater the footage per hour. Maximum footage thus requires heavy tools and a strong machine to operate the tools—a quite different machine than would be used for ordinary water well drilling and one which will stand much harder usage.

The Cyclone No. 14 Big Blast Hole Drill was designed about eleven years ago, after it became evident that Big Blast hole drilling could not be handled successfully with the ordinary well drill, and even today it is the only Big Blast hole drill designed and built exclusively for Blast Hole work.

The Cyclone No. 14 has always carried with it the guarantee that it will drill more hole at less cost than any other Blast hole drill on the market. This is not a paper guarantee. We are willing to prove the superiority of the No. 14 Drill by placing one of the outfits in your quarry against any or all other makes. If it does not out-drill and outwear all other outfits, we will remove it without cost to you.

Some of the reasons why the No. 14 carries such a guarantee are as follows: **First**—The drilling mechanism of the machine is so designed as to give maximum number of strokes of the drilling tools per minute, handling tools of the proper weight to meet all drilling conditions. **Second**—All parts that have heavy strains to carry are of cast steel instead of cast iron, resulting not only in reliability but lightness. **Third**—All timbers are of selected, straight-grained Oregon fir. **Fourth**—All operating parts are placed directly on the heavy main machine frame, resulting in solidity, and freedom from racking and twisting strains.

The Sanderson-Cyclone Drill Co.
Orrville, Ohio

Eastern and Export Office:
1778 Broadway, New York

We are always more than glad to be of service to quarry operators along any lines pertaining to Big Hole Drilling and Blasting. Write for our Blast Hole Data Sheet, Form No. 110.

Efficient Partner of the Tool on All Pneumatic Work

Nearly every job for pneumatic tools demands that the air hose be capable of withstanding rough usage, and one of the qualities of Goodyear Monterey Air Hose is its high resistance to abrasion.

Combining lightness with strength, Goodyear Monterey Air Hose also is easily handled under awkward working conditions.

Besides, Goodyear Monterey Air Hose offers successful resistance to the rotting action of oil.

Made of new, live rubber, specially compounded for this service, and of stout fabric construction, every element in Goodyear Monterey Air Hose works for full delivery of the pressure, together with freedom from kinks, cracks and bursts.

Long-lived, and dependable from first to last, Goodyear Monterey Air Hose has a notable record for operating economy in all fields of pneumatic tool service.

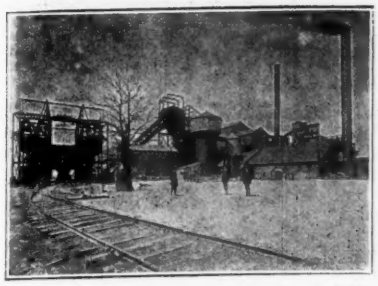
THE GOODYEAR TIRE & RUBBER CO.

Offices Throughout the World

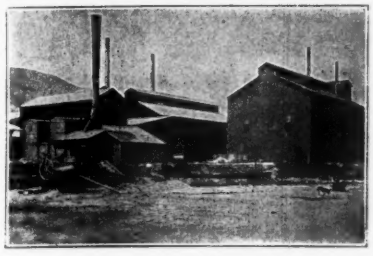
BELTING · PACKING HOSE · VALVES

GOODYEAR

The advertiser wants to know that you saw his ad in ROCK PRODUCTS

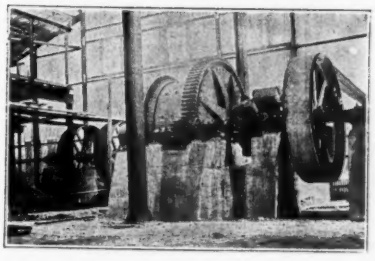


Brownell Improvement Co., Thornton, Ill., showing construction work of No. 24 Allis-Chalmers Crushing Plant



View of Catemon Smelter, showing waste heat boilers, reverberatory building and coal plant

Stone and sand crushing plant of Enterprise de Construction des deux Bassins de Radout a Double Entree a Toulon, France



Pretoria P. C. Co., Pretoria, South Africa

Universally Recognized as Supreme in Every Country

Allis-Chalmers complete rock-crushing plants have earned this distinction. Their superiority of design and construction for uninterrupted operation and most economical production has been established by actual performance in all parts of the world, and under all conditions.

They are built according to the best standards acknowledged in latest engineering practice and of the highest grade materials produced. The very latest manufacturing methods guarantee equipment which embodies all the newest improvements.

Allis-Chalmers Engineers are at your service to solve your crushing plant problems. Write for latest Bulletins

ALLIS-CHALMERS MANUFACTURING COMPANY

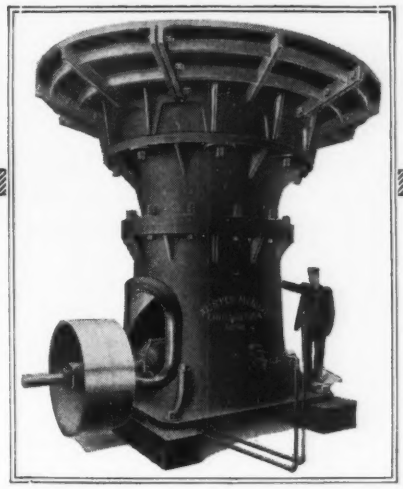
Milwaukee, Wisconsin, U. S. A.

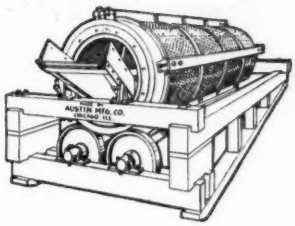
District Offices in All Leading Cities

ALLIS-CHALMERS PRODUCTS

Electrical Machinery
Steam Turbines - Steam Engines
Gas and Oil Engines
Hydraulic Turbines
Crushing and Cement Machinery
Mining Machinery
Flour and Saw Mill Machinery
Power Transmission Machinery
Pumping Engines - Centrifugal Pumps
Steam and Electric Hoists
Air Compressors - Air Brakes
Agricultural Machinery
Condensers

It gets immediate attention if you mention ROCK PRODUCTS

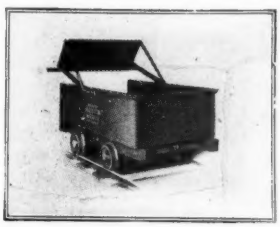




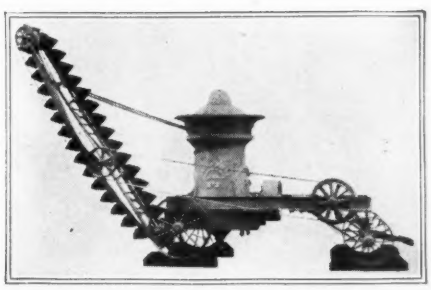
AUSTIN

GYRATORY ROCK and ORE CRUSHERS

have six superior features. Years of experience and research in the design and construction of rock crushers are responsible for the following superior features of the Austin Portable Gyratory Crusher:



1. It is the only crusher which has an automatic oiling system.
2. It is the only crusher having a rigid eccentric bearing.
3. It is the only crusher which after adjusting for wear of head and concaves will receive the same sized rock.
4. It is the only crusher in which the countershaft is supported on each side of driving pinion.
5. It is the only crusher in which the full eccentric bearing surface is retained when the head is raised.
6. It is the only crusher which is thoroughly protected from dust and grit.



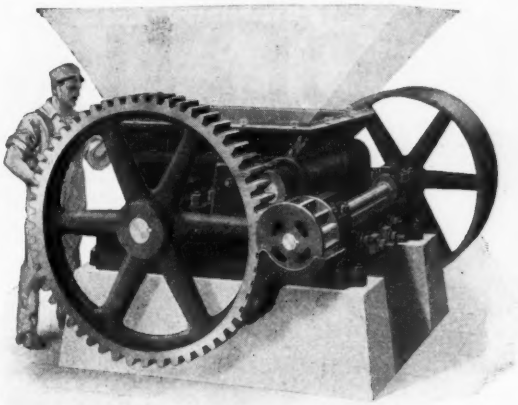
Capacities range from 5 tons to 600 tons per hour.

Austin Elevating Graders are characterized by the same quality and strength as Austin Crushers.

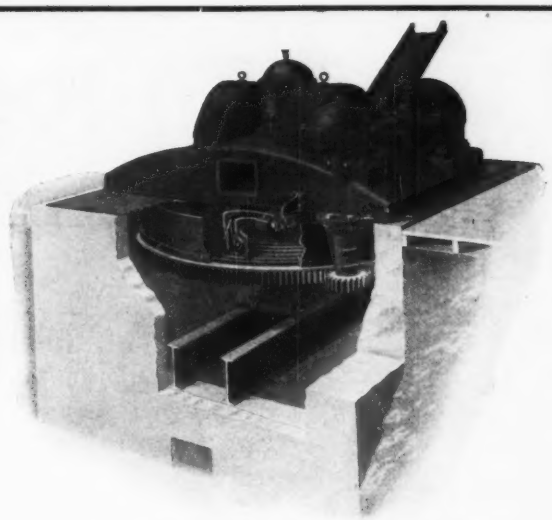
Write for descriptive literature and complete information as to size, price, weight, etc.

Austin Manufacturing Co.
Chicago

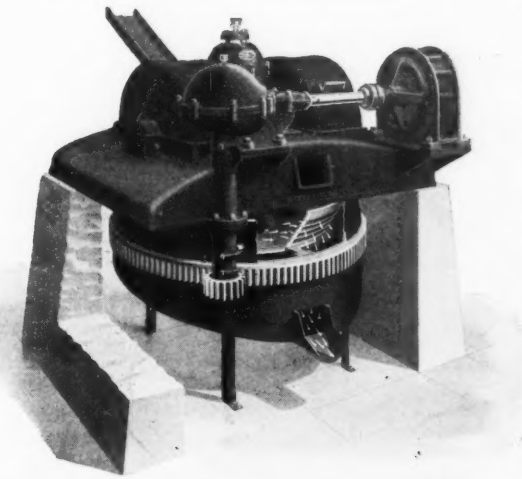
NEW YORK **SAN FRANCISCO**



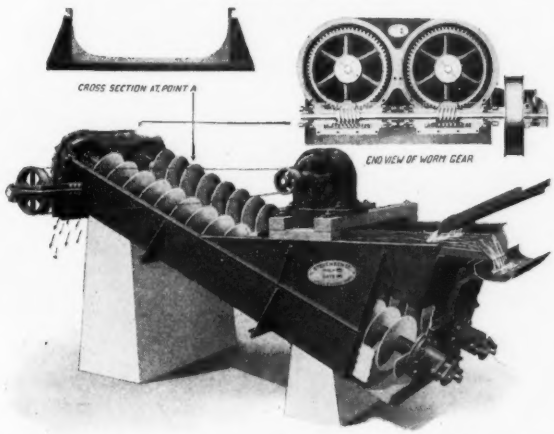
Single Roll Crusher
Size 18x30—300 to 500 tons daily



Model A-300 Step Bearing Type Dry and Semi-Dry
10 ft. Grinding Pan



Sand Grinding and Washing Pan, Model A-302
200 to 500 tons daily



Sand Washing and Separating Machine, Model A-306
Capacity depends upon kinds of material—
200 tons 10 hours

Machines for

Crushing

Grinding

Pulverizing

Empounding

Tempering

Mixing and for

Elevating and Conveying all kinds of Materials

Brick Tile and Sewer Pipe Machinery

Write for our latest bulletin showing machines of particular interest to you

---

Manufactured by

The Stevenson Co.

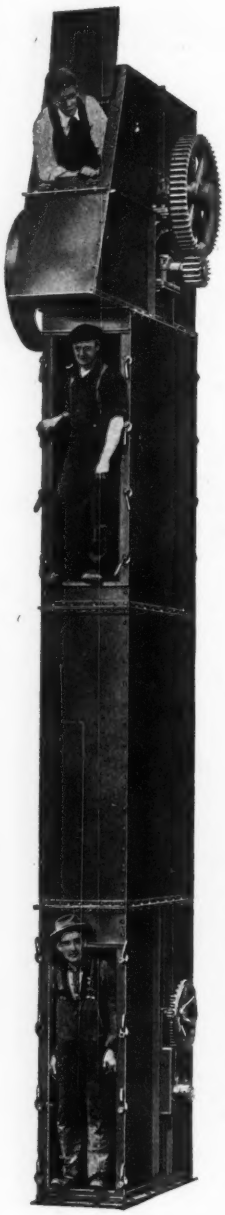
General Office and Works

Wellsville, Ohio

Engineering and Western Sales Office,
Monadnock Building, Chicago, Illinois

STURTEVANT "OPEN

"Open-Door" Swing Sledge Mills



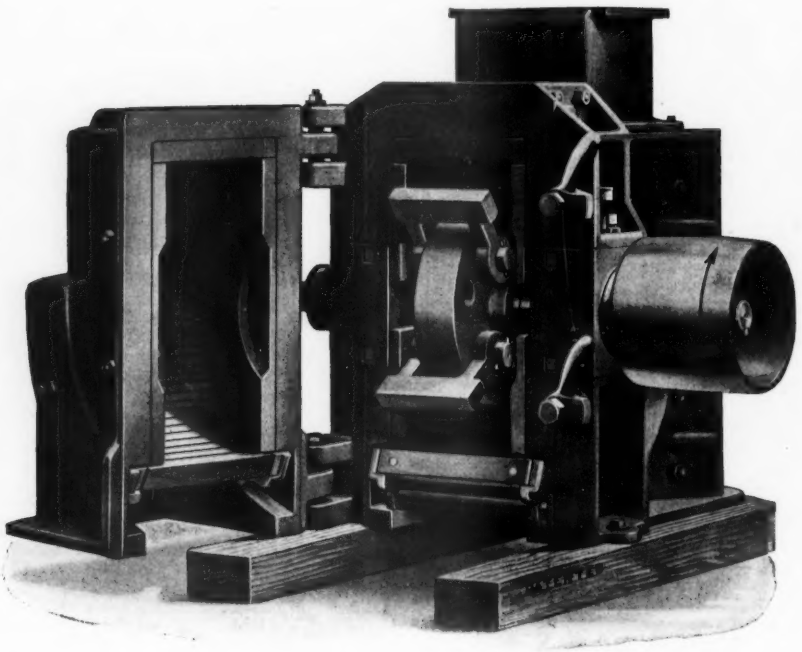
For reducing soft and moderately hard substances, such as Limestone, Burnt Lime, Coal, Bone, etc.

"ONE-MAN IN ONE-MINUTE" opens this massive door, through which every part may be reached for inspection, adjustment, repair, or for the removal of iron or other uncrushable substances.

High-speed Pulverizers produce enormous outputs if closely adjusted and kept in repair; otherwise, production falls off rapidly.

To repair other mills of this type is a long and difficult undertaking and therefore is generally neglected, and the mills seldom give rated capacities.

There is no excuse for neglect with "OPEN-DOOR" mills, and therefore their outputs are always at maximum.



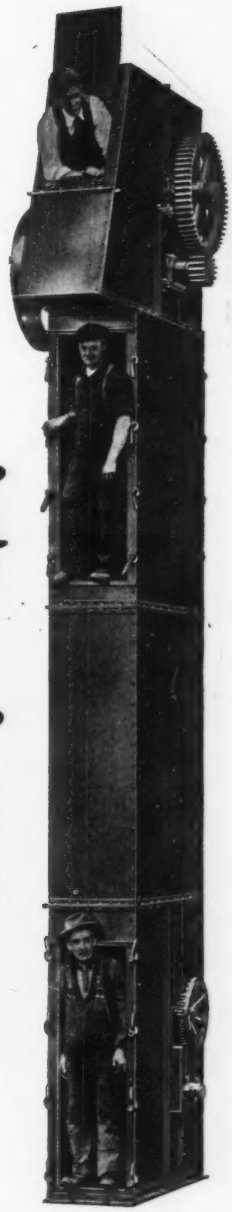
DOOR" MACHINERY

"Open-Door" Sturtevant Steel Elevators

All steel, accessible construction, so that one man in one minute can open any door without the use of tools and immediately get at all important parts.

Self-contained, everything complete, ready to set up when received. Big accessible discharge, with adjustable spill board. Split head, heavy gears, and pinions, ample shafts, ball and socket bearings. Automatic Take-Ups for quick, accurate, fool-proof adjustment, self-aligning bearings.

For convenience, labor saving, quick replacements and cleaning, the Sturtevant "Open Door" one man Elevators are unequalled.

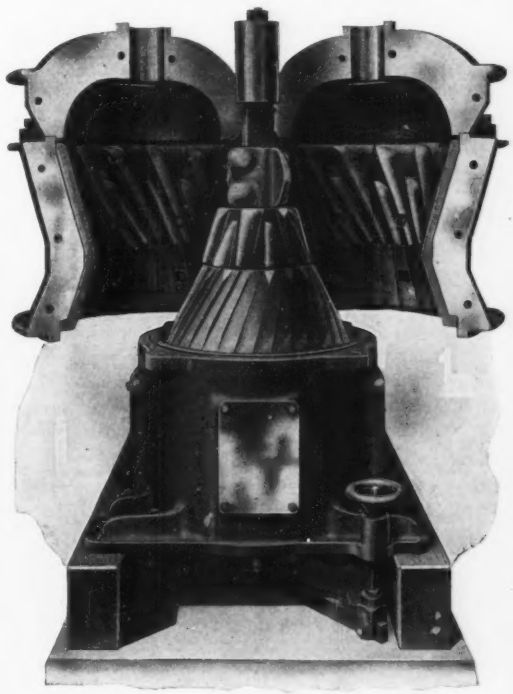


"Open-Door" Rotary Fine Crusher

BUILT IN FIVE SIZES

For the reduction of soft and moderately hard materials from large pieces to ½ and ¼ inch.

Unfasten the bolts, throw open the door and get at all wearing parts. One man can open the door in a very few minutes.



SHUT-DOWNS ARE COSTLY—TIME IS MONEY

"Open-Door" machinery pays because it operates more continuously than any other, therefore production is greater and less time and labor are necessary in case of obstruction or repairs.

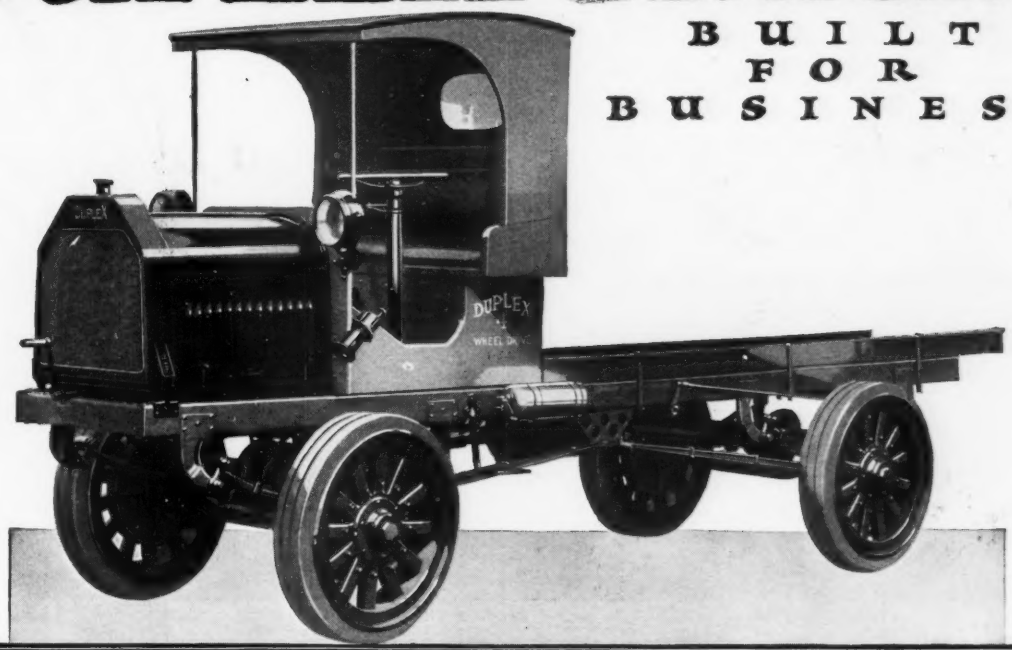
Send for Catalog of Sturtevant "Open-Door" Machines for Crushing, Grinding, Screening, Elevating, Conveying, Weighing and Mixing.

STURTEVANT MILL CO.

Harrison Square **Boston, Mass.**

DUPLEX TRUCKS

BUILT FOR BUSINESS



The Duplex Limited

HERE is a general purpose truck of medium capacity, pneumatic tired, which develops a road speed of 25 miles per hour loaded, with the motor running only 1300 R. P. M.

This means that the **power is in the motor itself**—and that the Duplex Limited does not depend for its power on low gear ratio.

The Duplex Limited is a Duplex through and through—fully as fit for its class of work as the famous Duplex 4-Wheel Drive—which has such a wonderful prestige in the heavy duty field.

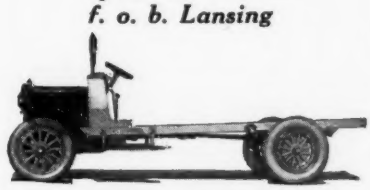
4 Cylinder, enclosed type motor —water cooled — cast enbloc. Bore 4", Stroke 5¼". 3 Point Suspension. Pneumatic Cord tires. 145" wheel base. Equipped with Windshield, Electric lighting and starting; Ammeter; Boyce Motometer; Speedometer; Electric Horn; Tools; Jack; Rim Wrench; Front fenders; Alemite Grease gun; Driver's seat without extra charge. (Power Tire pump at extra charge.)

Write for Booklets Describing the Duplex Limited

Duplex Limited

$2575

f. o. b. Lansing



IT is a fact that greater numbers of trucks are today being bought on their known performance value—not what you think they can do, but what they actually do accomplish.

The famous Duplex 4-Wheel Drive Heavy Duty Truck has back of it years of remarkable achievement—and a standing so high that it is generally accepted as the leading truck of its kind.

In the Lumber and Logging Industry; in the Oil Fields; in Road Construction work; for hauling Sand, Gravel and Concrete — in fact wherever **heavy hauling** is done there you will find Duplex 4-Wheel Drive Trucks — and you will find them making good.

The Duplex Truck Company is one of the oldest and most successful truck companies in America—made so by the **owner service** of the Duplex Truck itself.

Today Duplex 4-Wheel Drive Trucks are finding increasing favor in all lines of business because everywhere business men want to get away from experimenting with trucks.

The facts about the Duplex 4-Wheel Drive are becoming more and more known.

Duplex 4-Wheel Drive—3½ Ton Capacity. Price $4250, f. o. b. Lansing

The more critical you are as a buyer the more essential it is that you investigate the Duplex. Write for folders which give the facts about the Duplex in owners hands.

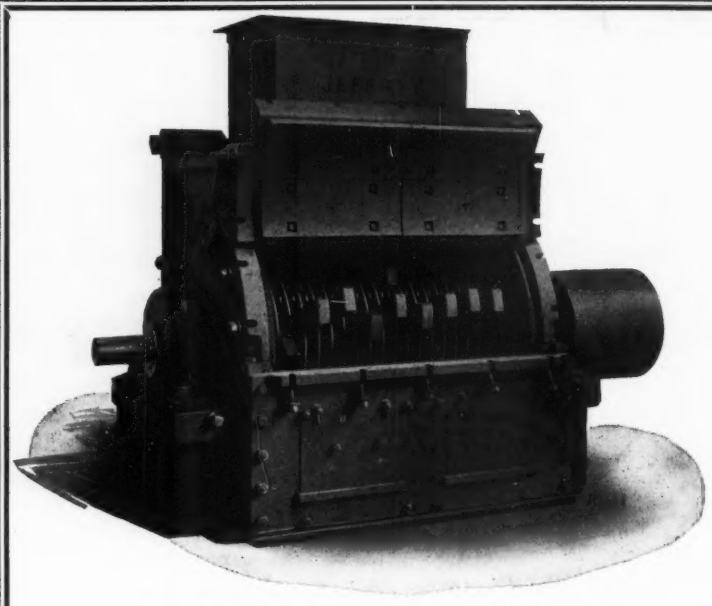
DUPLEX BUILT FOR BUSINESS

Duplex Truck Company

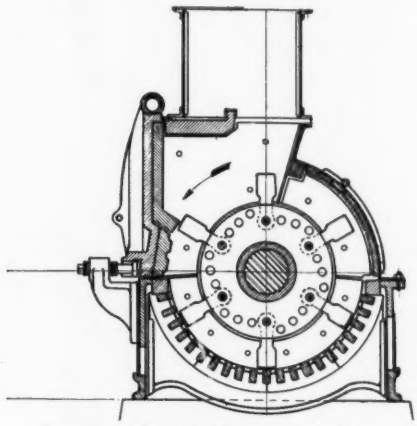
Lansing · Michigan

One of the Oldest and Most Successful Truck Companies in America

Cooperation is the thing—please mention ROCK PRODUCTS



Note: Accessibility, Compactness and Ball Bearings



Sectional View of Pulverizer showing Top Feed

Jeffrey TYPE "B" Ball Bearing Swing Hammer Pulverizer

for Breakdown of Large Pieces of Limestone, Gypsum, Shale, etc.

Leading Cement Mills, Lime Plants, Quarries, Gypsum Plants, etc., are being equipped with Jeffrey Swing Hammer Pulverizers to meet the constantly increasing demands.

Write for Pulverizer Catalog No. 147-D

The Jeffrey Mfg. Co., 935 North Fourth St. Columbus, Ohio

New York Boston Scranton Philadelphia Cleveland Pittsburgh Chicago St. Louis Birmingham Dallas Milwaukee Seattle Denver Montreal Detroit

Manufacturers of Pulverizing, Conveying and Elevating Machinery; Chains; Self-Propelling Loaders; Electric Trolley and Storage Battery Locomotives, etc.

OSGOOD
STEAM SHOVELS

A wonderful digger in the many branches of excavating. The problem of uncertain and high cost of labor meets its 'Waterloo" when an **Osgood 18¾ yd. Traction Revolving Steam Shovel** gets on the job.

It has established in actual performance a record of accomplishment for big capacity, ease of handling, low cost of operation and low cost of repairs.

We show below the

OSGOOD 73
3 1-2 Yard Shovel

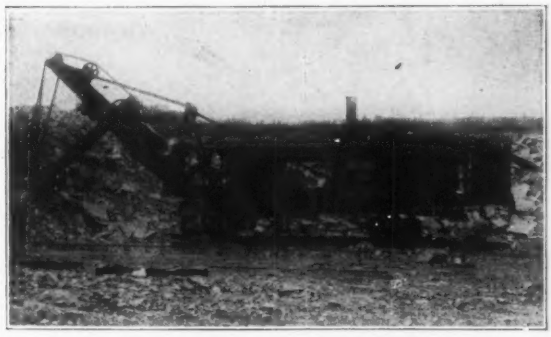
This is designed throughout for the heaviest kind of service. It meets demands where maximum strength is required and severe work to be done, such as found in iron mines, rock works, etc.

It has all the features in good steam shovel construction, which embody steel gears with machine cut teeth; manganese racks and pinions for dipper handle; cast steel swinging circle; heavy front end construction; especially strong boom; large boiler and water tanks; long car frame; enclosed firing platform; steam hoisting friction; by-pass throttle, etc.

We will take pleasure in furnishing you on request complete information on any of the different size shovels we build, which range from ¾ to 6 cubic yard capacity.

■

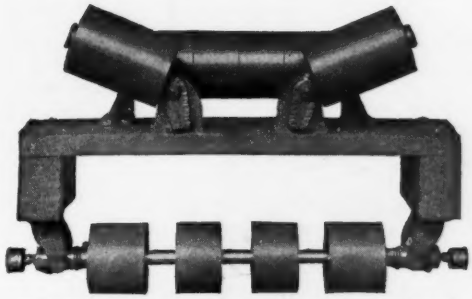
Write today for copy of our New General Catalog C-1.



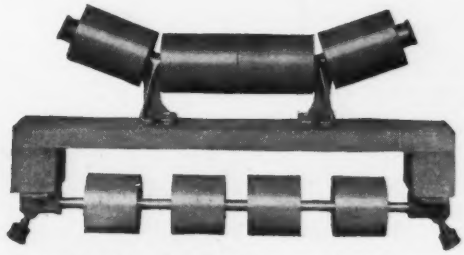
Osgood-73, in Heavy Quarry Work

THE OSGOOD CO., MARION, OHIO

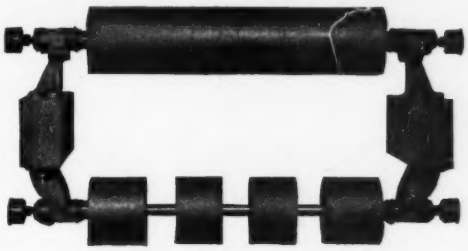
It gets immediate attention if you mention ROCK PRODUCTS



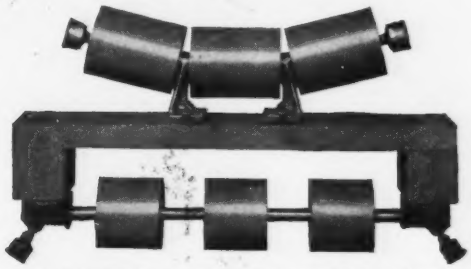
Style "C" Main Troughing Roller with 10°, 15° and 20° Trough. Style "R" Main Return Roller.



Style "A" Main Troughing Roller with 20° Trough for 20" to 24" belts. Style "S" Main Return Roller



Style "E" Main Flat Carrying Roller. Style "R" Main Return Roller.



Style "A" Main Troughing Rollers with 15° Trough for 12" to 14" belt, and 15° or 20° Trough for 16" to 18" belt. Style "S" Main Return Roller.

Getting Around The Labor Shortage

THE Superintendent who is struggling with the shortage of unskilled labor might well look into Leviathan-Anaconda Conveying Systems — which have done away with at least one labor problem in a score of leading American industries.

These finely-milled Main Belting Rollers, by providing a frictionless support for the belt, play no small part in the successful operation of such systems.

Every pulley is perfectly lubricated. The belt rolls over the pulley—never drags—and only a minimum of power is needed to keep the load moving.

The Style "C" Roller illustrated admits of instant adjustment to meet special conditions in any plant. Styles "A" and "E", while not adjustable, are perfectly finished and have the same high conveying qualities as the Style "C" Roller.

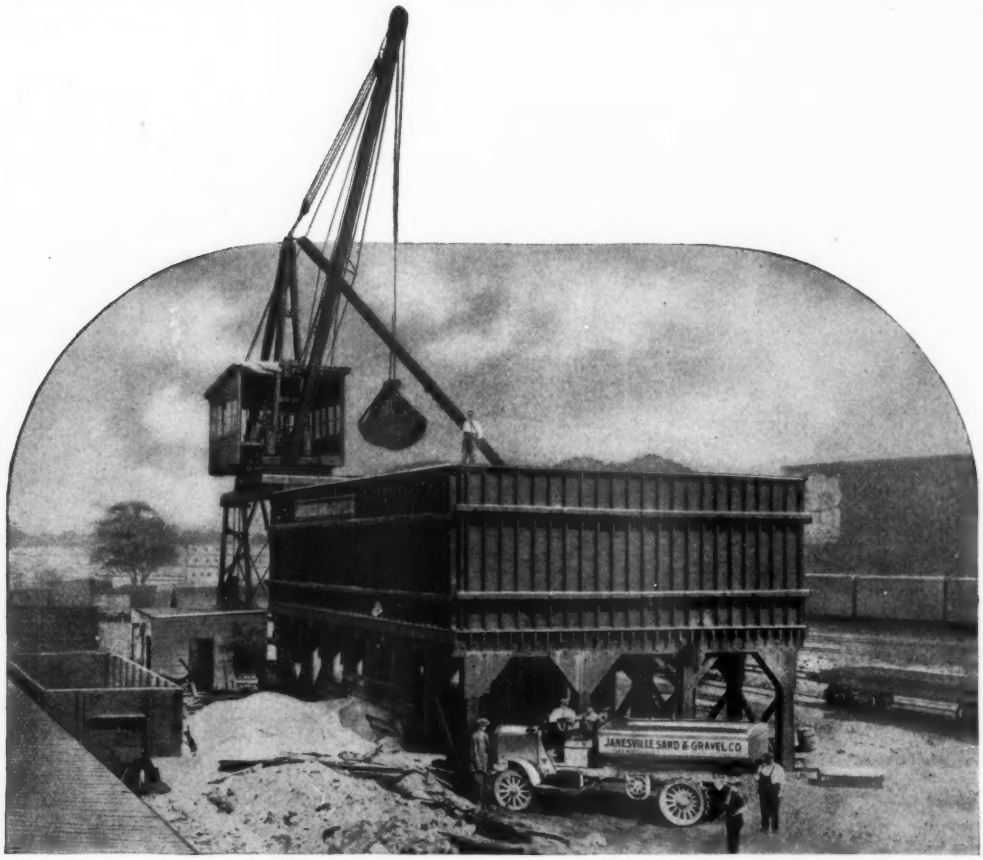
LEVIATHAN AND ANACONDA GUARANTEED AGAINST STRETCH BELTING

MAIN BELTING COMPANY - Philadelphia

New York Boston Chicago Pittsburgh Atlanta San Francisco

LEVIATHAN AND ANACONDA GUARANTEED AGAINST STRETCH BELTING

The advertiser wants to know that you saw his ad in ROCK PRODUCTS



"American" Machinery Cuts Handling Costs

"AMERICAN" Machinery handles sand, gravel, crushed rock, etc., economically and speedily from barge or car to storage bins or hoppers.

The great number of successful sand and gravel companies using "AMERICAN" Machinery exclusively is proof of its value for this service.

The illustration above shows the plant of the Janesville Sand and Gravel Co., Janesville, Wis., with an "AMERICAN" derrick on top of the bins. This derrick, which is operated by an "AMERICAN" Steam Hoisting Engine, transfers the sand and gravel from cars to the hoppers. Its long boom covers every part of the hoppers.

A letter to us outlining your handling problem will not place you under any obligation — and may help you to effect worth-while savings on your handling costs.

No matter where you are, an "AMERICAN" representative can reach you in twenty-four hours.

"Give me where I may stand and I will move the world"

American Hoist & Derrick Co.
55 South Robert Street
Saint Paul Minnesota

New York Chicago Seattle Pittsburgh New Orleans Detroit

Builders of "AMERICAN"

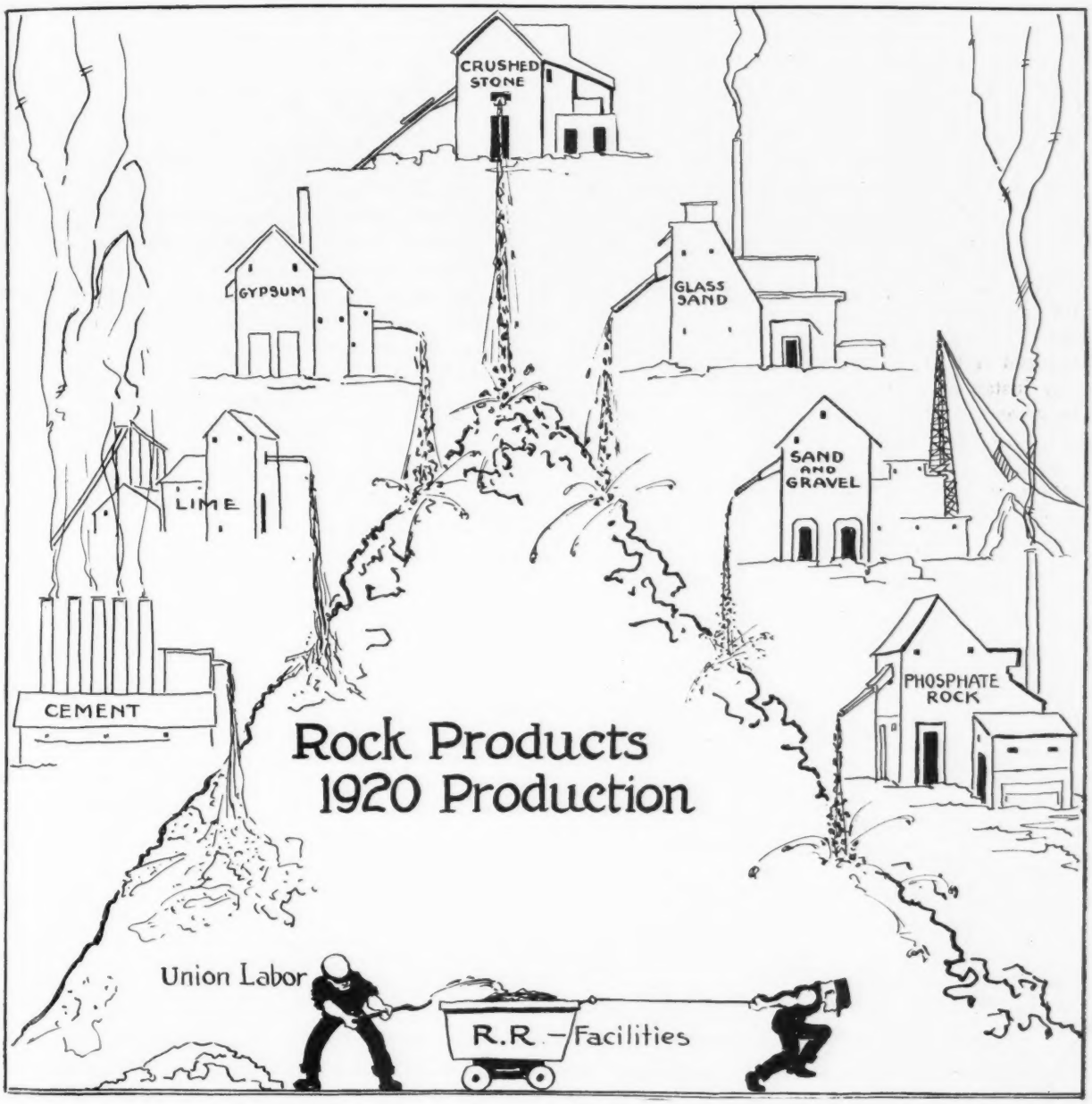
Hoisting Engines
Electric Hoists
Derricks
Locomotive Cranes
Railroad Ditchers
Logging Equipment
Sugar Cane Machinery
Marine Deck Machinery and Tackle
The Genuine "CROSBY" Wire Rope Clip

AMERICAN
HOIST & DERRICK CO.

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry

Rock Products

Vol. XXIII | Chicago, January 3, 1920 | No. 1



How fast can (or will) they move it?

The Rock Products Industries

Railway and Labor Problems the Hardest Nuts to Crack

A CONCISE SUMMARY of the operating season just passed—based on a very generous response to ROCK PRODUCTS' annual request for its readers' experience, opinions and prophecies—a summary in six words, is *"just one damn thing after another."*

One year ago the big problems facing rock products industries were the railway and labor situations. Today they are the same, "only more so." A year of big business was prophesied, but these two disturbing elements restricted production to an amount considerably below that of a normal pre-war year. Only in the Eastern and Southwestern States was the annual tonnage turned out in any degree up to the capacity of the producing plants. In the Central West it is generally reported as about 50 per cent of normal capacity.

Notwithstanding this experience, and these continued uncertainties in operating conditions, over which the producers have no control, there is a unanimous belief in an unusually large business in this year of 1920. Practically every operator looks for the best year ever, and is backing up this belief by increasing—in many instances doubling—the capacity of his plant. The greatest activity apparently is in the cement and sand and gravel industries, because of the practical assurance of an immense mileage of concrete roads in addition to unusually large demands for general building purposes.

The Railway Problem

Very few correspondents offer constructive suggestions on the solution of the railway transportation and freight-rate problems. The only opinion which seems to be generally held is that the railways should be restored as soon as possible to private management. There is no unanimity of opinion that freight rates on rock products should not stand an increase in rates along with other commodities, but this feeling can usually be traced to such an intense desire for transportation service that some operators are willing to pay any price for it, without investigation of its fairness.

In the East, where freight rates on rock products are generally higher for the same length of haul than in the Central West, there seems to be a belief that the limit of freight rates on such commodities as crushed stone, sand, gravel and slag has been reached and that railway men themselves realize this. Thus one very prominent operator, who is close to railway officials, states: "We do not anticipate, to any great extent, a lack of railroad facilities for handling our business, nor do we anticipate that there will be any modification of the freight rates, even if there is a general advance. Should there be an advance of rates on our products threatened, I think it will be a matter for concerted action, co-operating with the various Highway Departments, to bring pressure upon the railroads to halt in any further impositions on our product." This operator is in a district where the fairness of an existing schedule of rates on crushed stone has been passed upon by the Interstate Commerce Commission.

Another Eastern operator, in a position to know, states: "Our railroad is expecting the return of its property before the next operating season, and from what we know of the officials who will run it, we have great confidence that all the mineral aggregates we produce in 1920 will be hauled. If left to these officials there will be no demand for an increased freight rate on rock products, as they are convinced that their own net revenue would be reduced by increasing the rate."

The railway situation—in the opinion of most correspondents—is the result of inefficiency in management under federal control, inefficiency of railroad labor and lack of motive power and rolling stock. Return to private management may go a long way toward curing the first two evils, but it will not do much for the last, if it really exists. Consequently the problem in many sections may simmer down to this: "Which do you prefer, higher rates and car service, or present rates and indifferent car service?"

To be perfectly frank, the letters of correspondents in most instances show only a one-sided consideration of the railway problem, and there is wanting a spirit of co-operation to assist the railways out of their difficulties. In probably 99 cases out of 100, the railroad officers themselves do not know what it costs to handle various classes of traffic, and probably where it is possible and politic to do so, they would be glad to put the mineral aggregate traffic on a cost-plus-a-fair-profit basis. The trouble with the railway rate problem as a whole seems to be that some commodities, in many specific instances, are handled at far below cost, for politic reasons which are hard to correct, and that this deficiency must be made up, temporarily at least, by blanket increases on all commodities, whether they are reasonably able to carry the increases or not. The final adjustment of these inequalities must necessarily be a slow process, but it could be hastened by helpful and constructive co-operation on the part of producers.

This view is expressed in several letters from producers in all parts of the country. A Texas cement operator writes: "The railway situation presents a problem that needs earnest and sincere attention from all, *and it is a question that can only be treated with by those in possession of facts and figures, before any*

proper solution can even be suggested." One well-known Michigan operator writes: "The railway situation will be all right when the people of the country are wise enough to amend the old saying, 'Give the devil his due,' by adding the words 'and corporations, too.'" A Southern operator writes: "My idea of the whole railway situation is that the interest of the shippers, the railroads and the public are one and the same, and the problems can best be worked out by getting as closely together as possible." An Illinois operator puts it this way: "The question of what tolerable freight rates are must be determined more or less in the light of what the railroads really need in the way of revenue. They should be made after careful comparison with other rates and the operating conditions prevailing during the period of shipment. This is a big problem and one on which most operators could write an extensive brief."

The Labor Problem

It is obvious from the daily news that the labor situation is as unsettled as it was a year ago, and there is no prospect of its easing up in the immediate future. Only in the South do many operators look for better labor conditions than in 1919, and this is probably due to the return of many Southern negroes to the sunny South, after their munition plant experience in the chilly North. The great majority of operators report no easing up of the past season's labor scarcity, and many predict a much more serious situation in 1920.

The quarry labor problem, in particular, is becoming acute. An Illinois quarryman states: "Labor during the past season has been very unsatisfactory—more so than during the war. It seems that the class of labor that can be secured in quarries is not a class that desires to better its condition, and does not care to confine itself to one particular operation. The recent coal miners' strike indicates that the advance in wages will have its effect on other industries, including quarry operation, which means an advance for the year 1920." Another southern Illinois operator writes: "The important question confronting us is the almost total disappearance from this country of the pick and shovel men, which in plain English, means there will be a serious shortage of quarry labor. Again it would seem to me that the quarry industry faces higher priced labor because of the increase awarded the soft coal miners. In order to attract labor to quarries we must be prepared to pay approximately a minimum of $6 per day of eight hours, or 75 cents per hour. Statistics show that with an increase in wages we have decreased efficiency, therefore the increase in cost of production will come not only in increased wages, but there will be a decreased amount of labor performed. This, at the moment, appears to be our main problem in 1920."

No one ventures much in the way of suggestions for meeting the labor condition, which an Eastern quarryman analyzes as an "unrest, which seems fundamentally due to a lust for gold. The spirit of service and co-operation seems at low ebb on the part of everybody, and until there is a greater sense of individual responsibility in matters of justice and mutual consideration, much of the joy will be taken out of life." A Wisconsin quarryman's suggestion for meeting conditions is expressed as follows: "We all know that a stone quarry is the last place a fellow will look for a job, and consequently the stone man, in a way, must wait until all other jobs are filled, and take the surplus labor, providing there is any to be had. In our estimation our object should be to get the price of the material up as high as possible in order that we can afford to pay labor more than they are able to earn elsewhere. Even at that we may not be able to hold a crew. Most quarry laborers seem to be travelers these days. We intend overcoming this by dividing our eight months' working season into two halves of four months each. We will pay the current hourly wage and offer a bonus of a few cents for each hour, providing the laborer remains for a period of four months."

A unique labor condition is reported by one quarry operator at a Great Lakes port, as follows: "Just at present we find the labor situation is easing up; in fact we have had an opportunity of refusing work to men from time to time. This sensation was unknown for over a year prior to the last 30 days. But there does not seem to be any inclination to accept reduced wages. We are having a great many men apply for work at our quarry who have been working in the shipyards, but we do not hire these men when we can obtain others, because we know that their efficiency has been reduced so low that there is scarcely anything like efficiency in them. The United States Emergency Fleet Corporation contracts are being completed and many men are being thrown out of employment as the result. We do not anticipate much of a change in the labor situation for the next year. Many aliens who were laborers in this territory have returned to Europe and American-born do not care for this kind of work, but conditions probably will force some of the latter class to take whatever work they can obtain by next summer."

An Iowa quarry operator finds consolation in the fact that some of the alien laborers who returned to their native lands after the war, found living conditions there so bad and the costs so high that they immediately made application for permission to return to this country. It is a fact that East coast ports are becoming crowded with immigrants within the last few weeks, but the immigration laws are now so strict that many will find difficulty in getting in.

Summarizing, the 1920 labor situation, except in isolated instances, will be as bad as or worse than it was in 1919. A general increase in wages may be figured on, rather than any reduction. Liberal allowance must be made for this factor in setting prices at the opening of the season in 1920. It is not likely that there will be general wage reductions until there is a slackening of industry as a whole—until we have a

period of hard times—which is not likely to come for a year or two, at least. The attitude of labor at present seems to insure the forcing of a peak load of wages on industry, and a resulting sudden slowing up in all new development. Possibly that is the only way to bring the average man to his senses, for as one operator puts it, "Not more than 5 per cent of human beings can stand prosperity, while at least 95 per cent *can* stand adversity."

Production and Prices

The lateness of the season when orders were finally received, the difficulty in procuring labor, the car shortage, and the railroad shopmen's strike, the coal strike and embargo on the use of open-top cars, all contributed to cut production to about 50 per cent of what the plants operating in 1919 could normally have produced. Many operators are carrying over unfilled orders for thousands of carloads of material. The box-car situation was little better and lime and cement production was seriously curtailed for this reason during the summer season, and by the coal shortage at the end of the season.

In the East and Central West, where there is a well established mineral aggregate industry, the opinion of producers is almost unanimous that they can take care of 1920 demands if given a fair opportunity. In the Far West and in outlying sections, where little or no improved road work has been done up to the present time, there is a real shortage of material, and in many such cases the operators have been very frank in stating that the prospective tonnage in 1920 is far in excess of their ability to supply. Many such letters have been received. With very few exceptions operators are contemplating increasing the capacity of their plants, in many instances doubling the capacity. A few, however, will not take any definite steps until adequate transportation service is assured.

There does not appear to be any scarcity of capital for legitimate enterprises, and only a few operators complain of not being able to get what machinery and equipment they require. The two factors which hinder production and will hinder expansion are unsatisfactory railway service and inability to get labor. Another factor which is hindering expansion of facilities by experienced producers is the uncertainty in freight rates and the inability to get rates to newly established markets or sidings, in any degree reasonable, as compared with existing rates for a similar haul. This is a factor which any newcomer in the game should investigate most thoroughly, for it is hardly safe to erect a plant and then throw yourself on the mercy of the present rate-making authorities. The rate to be paid to every conceivable point should be known in advance of the development, if possible.

Although the prices of all rock products materials were deemed high by the general public in 1919, there is abundant evidence that they were not high enough to pay for the hazards involved. Prices were generally established at the beginning of last season, which, it was estimated at the time, would cover operating expenses. Orders were withheld so long that some reductions in prices were forced in many instances, while wages were continually going up. The various interruptions during the operating season cut down production and sent the unit cost up so high that very few operators finished the season with anywhere near a satisfactory showing. This year they face the same uncertain conditions and the general sentiment is that prices must rise to cover them, otherwise there would be no justification in these days of immense profit in other lines of business in continuing to put money and effort and time into crushing or gravel plant operation. On the other hand, several operators agree that if steady transportation service were assured, with no interruption of production, the 1919 prices might be maintained throughout 1920.

The situation in the lime industry is admirably summed up by a prominent lime manufacturer as follows: "We averaged a trifle less than 50 per cent of the capacity of our plant from January 1 to August 1, 1919, due to scarcity of business. During that time our car supply was plentiful. About August 1, and for two and a half months thereafter, our car supply was so low we averaged, even by loading cars to capacity, about 30 per cent of our normal capacity. From the month of October to the end of the year our car supply has been some better, but we were not able to get back our organization and get shipments up to more than 60 or 65 per cent of capacity; and then we were down and out on account of coal shortage. Altogether the year was the most unsatisfactory one we have ever experienced, so far as shipping and manufacturing conditions are concerned. Our present (Dec. 1) plant price of $11 per ton for hydrate in 50-lb. paper bags, is not any too high, taking into consideration our inability to ship a larger proportion of our plant capacity. We are looking for a pretty good demand for our lime in 1920, but think that our troubles will be labor production and a recurrence of car shortage in the spring and fall seasons. We have put in our best efforts to overcome these difficulties, but without success."

In the silica sand industry one of the largest and best known producers states: "The prospective demand for our material in 1920 is not in excess of our ability to produce, but is decidedly in excess of our ability to ship, on account of the condition of the railroads. Our 1919 output was not our maximum, solely on account of inefficient railroad service. We do not contemplate increasing our output, because there would be no object in greater production without adequate railroad service. We do not consider present prices sufficient to compensate for present uncertainty in operating conditions, but we intend to do our utmost to avoid increasing prices, in the hope that conditions will improve."

A prominent Portland cement manufacturer writes: "We feel confident of our ability to produce the ce-

ment that will be required of us in 1920, but doubt our ability to move the material, due to insufficient and erratic supply of railway equipment. Our 1919 output was not our maximum. However, we are increasing our possible production by doubling the capacity of one of our mills. Prices are fairly stable, but the future, due to the uncertain conditions of both material and labor, is hard to judge. We, however, anticipate no *decrease* in the present prices. The greatest obstacle to increasing any facilities in this section is the inadequate car service and supply of labor. However, despite this, we look for a favorable season and one that will open early, even under unfavorable weather conditions."

Another cement manufacturer writes along similar lines, stating that for the first half of 1919 his output was only one-third of normal. He does not consider present prices in his territory sufficient to compensate for present uncertainty in operating conditions, and are in fact, insufficient to return a fair interest on the investment. The 1920 price must tend upward, unless people become convinced that the present prices justify a more vigorous prosecution of general building operations; and present prices of our material are only maintained for the purpose of assisting the resumption of building."

The letters received from ROCK PRODUCTS readers include those from producers in practically all the rock products industries—cement, lime, crushed stone, sand and gravel, slag, rock phosphate, gypsum and silica sand—and the almost unanimous opinion is expressed that 1920 prices for these commodities must be more than those of 1919. Only a few venture to predict how much the rise will be. These estimates run from 10 to 25 per cent. The only hope of maintaining present prices lies in speedy settlement of the labor and transportation problems, and neither shows much prospect of being settled soon.

Compliments for the Associations

The trade associations in the rock products field come in for many compliments. Their fight for car service and against freight rate increases is widely recognized. The general opinion is that they cannot be more useful than to continue their work along these lines. Certainly the analyses of industrial conditions which these many letters show is sufficient proof of the absolute necessity of these associations, both local and national, and since their necessity is demonstrated, it follows that they must be supported morally as well as financially.

Conclusions

The most remarkable feature of all these letters is the undaunted optimism and enthusiasm of all the writers in face of unparalleled problems and difficulties. There is also a most healthful interest shown in discussing national problems and their solution, when not so long ago the average operator took little interest in anything outside of his immediate market territory. Altogether these letters show and prove what we are pleased to consider the dominant traits of American character—optimism and a readiness to find a way out of any difficulty and to adapt oneself easily and quickly to conditions as they develop.

Rock Phosphate Fast Coming to Its Own

ONE OF THE ACHIEVEMENTS of 1919 in the rock products field was the establishment on an operating basis of the Soft Phosphate Association of Florida producers. This association under the able management of Virgil H. Larner, is making great strides in introducing rock phosphate as one of nature's fertilizer materials.

The rock phosphate producers of Tennessee, Kentucky and Florida all suffer from the fact that the strongly intrenched acid phosphate manufacturers are sitting on the lid to prevent any promotional work being done for rock phosphate. Some of the deposits and a number of plants in these states are owned or controlled by the commercial fertilizer interests, and most of the producers are dependent on these manufacturers for most of their trade.

The truth about the value of rock phosphate is only slowly filtering through the agricultural mediums, because the acid phosphate manufacturers know that as soon as the truth does become known, the demand for the acid phosphate will be seriously affected, and the phosphate fertilizer industry will revert to the producers of the rock instead of themselves. That day is being hastened by the activities of such associations as the Florida Soft Phosphate Association. The producers of Tennessee and Kentucky are as yet unorganized.

It is beginning to be understood now, as Dr. Crocker points out in the article on agricultural gypsum on another page of this issue, that lots of the good attributed to acid phosphate is because of its sulphur content rather than its phosphate. Nature's cheapest and best source of sulphur fertilizer is ground raw gypsum rock or land plaster, and the Gypsum Industries Association is going to drive this fact home within a short time. Nature's cheapest and best source of phosphate fertilizer is ground rock phosphate, and just as soon as rock phosphate producers get together and stand up for themselves, they too can drive *this* home.

The day of the Nature's rock product fertilizers is at hand. Lime, limestone, gypsum and rock phosphate are coming to receive the recognition long withheld from them for one reason or another. Possibly the fact that in some states the agricultural experiment stations are supported by a tax on sales of commercial fertilizers may have some relation to the long delay, and may explain why farmers have paid good prices and high freight rates on fertilizers composed largely of "fillers"—sometimes sand, sometimes ground limestone. The commercial fertilizer manufacturers, by the way, are objecting to the term "filler," which is so significant, and are considering the term "carrier" as a better camouflage for disposing of their wares.

Lime Industry Assured Prosperity

President of the National Lime Association Reviews 1919 Conditions and Foresees Great Demand in 1920—and a Big Opportunity for Producers

IN THE LIME INDUSTRY it is a bit hard to review 1919 and forecast the new year in a general statement without expressing some views that may be quite wrong, as applied to certain sections of our country.

The trade demands upon our industry vary radically in different districts and by reason of the variable needs of certain classes of consumers supplied by different groups of lime producers.

Yet certain general factors have and will influence the lime industry to a greater or less extent throughout the country.

The year of 1919 has seen a most momentous step—a change from the war to a peace basis. That this critical year has been accomplished with so little suffering and loss to our industry as a whole, speaks volumes for the well-balanced common sense, the fairness and the appreciative insight of these business men respecting the acute yet temporary problems arising out of the return of industry to a stabilized peace basis.

Generally speaking, the first half of 1919 saw a most stagnant condition in the demand for lime for its principal use—that of construction. The chemical demand was somewhat better, but generally subnormal. The agricultural use of lime products was probably the only demand that held active during the first half of the year.

Charles Warner, President, Charles Warner Co.; President, National Lime Association

But as the season advanced and our country and its business men caught their second breath following the sudden cessation of the great war, most all lime plants quickened their gait of production. Hence the fall season of 1919 saw most lime plants pushing production, not to kiln capacity, but to the capacity limited by some one or more of the other serious limiting factors—labor, fuel, cars, etc.

At this moment our industry is suffering the usual wintertime lull in the building and agricultural demand in most sections, but I am quite convinced that our experiences of the past fall were but a taste of the experiences we face for 1920.

That the coming spring demand for lime products will speedily expand above the past fall's record seems assured. Natural conditions, plus the effect of the continued and persistent promotion of broader knowledge on the use of lime products as directed by our various association actions, are sure causes for the greater and still greater demand ahead of the industry.

It will of course continue to require a constant and cohesive effort of lime producers to keep this demand growing actively ahead of natural increases in production. For the moment the natural forces of general industrial expansion are with us. And while 1920 will favor the lime industry with a strong demand, partly in spite of us and partly because of the cumulative effect of the early efforts during the past few years in association promotion of trade, yet out of our years of plenty, we must assuredly build a larger and broader knowledge of the use of lime products among a vastly greater number of people who can and should use these materials in the years to come.

So 1920 promises the lime manufacturers, generally speaking, both a gratifying prospect and a great opportunity. The gratifying prospect lies in the strong probability that the immediate demand (with the opening of the season in each section) will tax plants to capacity. We will be freed from immediate concern for our bread and butter, since the volume of orders will naturally strengthen the market condition and gradually effect a much-needed advance in market prices for lime products through the normal action of a greater demand than supply. The manufacturers' problems will be largely those of production and its attending questions of labor, fuel and car supply.

Under such conditions our plants will be earning suitably, our minds should be freer and our energies ready for constructive work to prepare for the lean years to come.

And right here is where and why our important business—the lime industry—will have its great opportunity during 1920.

Well balanced, carefully planned and thoroughly developed promotion campaigns for encouraging the broader use of products from an industry *cannot* be wisely and patiently developed to best advantage during lean years. At such times the producers' minds are

too concerned about the orders immediately needed to sustain operation and earnings. Under such conditions the average man loses both his perspective and his patience and this tendency definitely and naturally encourages short-sighted and unwise policies imposed upon a broad educational campaign for the sake of producing a bit more immediate results rather than permanent results.

Taken as a whole, our plants will unquestionably be working to the greatest capacity during 1920 that our labor, fuel and car supply will admit. And the wise manufacturer will not have burdened himself unduly with lower priced contracts or commitments for the sale of his lime products, but will have his order books open to benefit by the improving market prices which as naturally follow the improvement in demand as day follows night.

With our minds freer of immediate sales problems and our earnings more substantial, we manufacturers of lime products have this great opportunity of devoting more of our time, of our energies and of our funds to the courageous development of our promotion campaigns. What we will do this year of plenty, when we can well afford to act more freely, will return to us many times over in the lean years to come, for unless these lean years are at least substantially offset by the benefit of having established a much broader consuming public than exists today, they will surely act to curtail our tonnages, to thrust down the market price to cost or below cost, and in other ways to affect our earnings in a heart-rending fashion. This has happened.

It is gratifying to see the interest that has already been developed in a far-sighted educational program. Many manufacturers who have been in close touch with the early stages of our Association plans have become strong converts to the principle that this work is just as important as any department in his own business. The team work is growing in many sections to bring around this intelligent education of the public, practically guided by the men who have most to benefit by the improving demand during the next few years; namely, the executives and the principal stockholders in these lime-producing companies. This is the most encouraging sign for a long pull in our industry. If we use this great opportunity of 1920 to its fullest, we will have driven one more nail in the coffin of an unstabilized industry.

I wish to take this opportunity to extend my best wishes for the New Year to my friends, the lime manufacturers of the United States, and particularly to express my very keen gratification to those who are so ably and whole-heartedly supporting the development of our great industry through their energetic membership in the National Lime Association and its district bureaus. Greetings.

CHARLES WARNER.

Eastern Crushed Stone Producers Progress Toward Standard Sizes

A MEETING of representative state highway officials and crushed stone producers of the middle Atlantic states was held in Philadelphia at the Engineers' Club, Tuesday, November 18, under the auspices of the Pennsylvania State Highway Department, with Col. Wm. D. Uhler presiding, the writer acting as secretary. The following state highway officials were present: Col. Uhler, Chief Engineer, Pennsylvania State Highway Department; H. E. Hilts, Principal Assistant Engineer, Pennsylvania State Highway Department; H. S. Mattemore, Chief Engineer of Tests, Pennsylvania State Highway Department; Wm. A. Treadwell, Assistant Engineer, New York State Highway Department; Wm. G. Thompson, Chief Engineer, New Jersey State Highway Commission; R. B. Gage, Chemical Engineer, New Jersey State Highway Commission; Chas. M. Upham, Chief Engineer, Delaware State Highway Department; John M. Mackell, Chief Engineer, Maryland State Roads Commission.

In addition, practically all of the crushed-stone shippers in this district were represented. The Buffalo district was represented by C. A. Freiburg, of the Buffalo Cement Co., and James Savage, of the Buffalo Crushed Stone Co. The Hudson River district was represented by M. D. Wandell, of the New York Trap Rock Co.

The purpose of this meeting was to endeavor to obtain an agreement between these contiguous states as to the sizes of stone in the state specifications and, further, to have these more or less standardized specifications of such a nature as to be adaptable to the present methods of operations of the stone producers. Col. Uhler and the other state engineers felt that if such specifications could be adopted, with possibly a somewhat more lenient range as regards size, it would tend to increase the productive power of the various stone plants and such an increase in production should have the tendency to lower prices.

After spending considerable time in general discussion, which resulted in individual plant problems being brought out, it was soon seen that the purpose of the meeting was not being accomplished; thereupon Col. Uhler decided to appoint a committee representing the shippers from the eastern Pennsylvania district, the western New York district and the Hudson River district, which resulted in the following committee being appointed: John Rice, representing the eastern Pennsylvania district; James Savage, representing the western New York district; M. D. Wandell, representing the Hudson River district. This committee was requested to report back to the state highway officials.

It was finally and generally agreed upon that the proper specifications for stone for concrete roads, which comprises the bulk of the tonnage required by the states represented, would be material passing a 2¾-in. screen and rejected on a ⅝-in. screen. This is a more liberal specification for concrete roads than the various ones under which we are now operating; and it is the purpose of the various state highway departments represented to arrange for a uniform specification for macadam road sizes.

The State of Pennsylvania, in asking bids a few days ago on approximately 130 to 140 miles of concrete roads, changed its specifications to conform to the size adopted, viz.: ⅝-in. to 2¾-in.

Needless to say that the shippers are immensely pleased with the co-operation and prompt agreement between the state highway officials to conform with a standard specification for stone sizes for various classes of road work, which now will be uniform in five and probably seven contiguous states. This, with the more liberal allowance in the maximum size hole in the screen for concrete road stone will be helpful to the shippers.

EASTERN STONE ASS'N,
H. B. Allen, Secretary.

Come to Louisville Convention All You Crushed-Stone Men!

President A. J. Blair of the National Crushed Stone Association Tells Why

TO THE CRUSHED STONE PRODUCERS: Our industry is on the eve of the greatest activity it has ever known. With the large amount of prospective road building, as well as industrial building, the demand is bound to be enormous, and will tax the plants and the ingenuity of the managers to supply it. A careful survey shows ample and sufficient plant capacity now in existence (except in isolated cases) to supply this abnormal demand if shipment can be extended over a longer period and sufficient transportation provided.

A. J. Blair

Generally, plants have not been going full until June or July, after two or three good months are past. This year strong efforts are being made by highway officials to get work out early, and this is going to help materially.

Transportation is the most serious matter. During all of this season one thing or another has continually tied up cars and the movement of our material. In the writer's opinion this is largely due to the slowness of the railroads in moving carload freight. Cars moving from our quarry to Milwaukee (23 miles) formerly took 24 hours to be placed on track for unloading. Anything longer was unusual. This year cars have never been placed inside of three days, and generally it has taken four or five days, and at times even a week. I do not know why this is so, but it is apparent that it necessitates from three to six times the number of cars to handle the same amount of business. These cars have not been built. Another thing, these extra cars in transit get into the terminals and on the sidings and block up things generally, compounding the burdens for the carriers. How the monkey-wrench came to get into the cog-wheels is hard to tell, but something has slowed down transportation all over the country. Whether a return of the carriers to the owners will cure this trouble is hard to say, but most producers believe it will help.

What is the condition going to be when the roads are returned? Personally, I do not believe we will ever have the old conditions back again where most of our fights for rates, service, etc., were before state commissions. The national government is going to have more to say about such matters hereafter, and this is one strong reason why all aggregate producers should join their national associations. Our association has been fighting the industry's battles at Washington for two years now, and is recognized as a live and active organization. There is strength in numbers, and all producers should be with us and help both morally and financially. Do not let and expect someone else to carry your burdens for you and fight your battles. Do your bit, too. If you are not now a member or have not sent in your application to our secretary, do it now. Come to our annual convention at Louisville on February 9, 10 and 11. The speakers you will hear there and the information exchanged will be worth more than the dues you will pay. Let us get a 100 per cent organization that will make our industry one to be respected and not the goat as we have been for so long.

Who are the first ones always to be deprived of the use of open-topped cars? We aggregate producers, every time. Why? Because someone with more force back of him put up a louder and stronger "holler" to the powers that have the say in such matters. We must get strong if we want service. Look around you and see which industries are prosperous and making money—those well organized every time. I do not believe 75 per cent of the stone, sand and gravel producers have averaged 5 per cent per annum net profits in the last ten years. That is not enough for any business, and especially one as precarious as ours. We do not want to be profiteers, but we do want to make a fair profit and to this we are justly entitled. Let us get together and get it. Another thing, we will get Bolshevists in our quarries if we do not unitedly oppose it and help other industries in opposing it. We cannot afford an eight or a six-hour day when we work but eight or nine months in the year. Think it over. There are lots of other things that could be said in favor of our national organization and why you should join. I have pointed out but a few. Do it now. Join your national association.

A. J. BLAIR, President,
National Crushed Stone Association.

Remodeling Old Crushing Plants

Part III—Increasing Screening Capacity—Rejections Crushers—Electrification—General Conclusions—Plant Details

By Brownell McGrew

TWO PREVIOUS ARTICLES have discussed the advantages to be gained by installing a larger primary crusher. The following article describes other changes necessary to fully realize on the investment in new crushing machinery.

Screens

We will next consider increasing the capacity of the plant as a whole. Any radical step in this direction would entail rebuilding rather than remodeling; but it is often possible to effect substantial increases in the capacity of the screening and re-crushing plant by making additions to the equipment, without incurring any great expense in alterations or additions to the building itself. One of the simplest ways of increasing the capacity of the screening plant, in mills equipped with one screen or with a pair of screens in battery, is to install an auxiliary screen to take care of the finer grades. Where the headroom is limited, distribution from the lower screen—or from the primary to the auxiliary screen—can sometimes be taken care of by short belt conveyors.

When the headroom is not sufficient for the installation of an auxiliary revolving screen, the shaking or vibrating screen may be used. It should be remembered, however, that many of the old wooden frame crushing plant buildings are ill adapted to withstand the heavy vibrations set up by some types of shaking screens; and the screen should be chosen with this fact in view.

Another method of increasing the capacity of the screening plant is to add to the number of primary screens. In plants equipped with one screen this addition can generally be made by shifting the present screen a few feet to one side, and placing the new screen beside it, raising the head pulley of the elevator enough to obtain the necessary chute pitch from it to the screens.

A problem that frequently presents itself to the small plant operator is that of increasing the number of grades to be made, as well as increasing the capacity. Here, too, the auxiliary screen offers itself as a simple means of accomplishing the desired increment. As an example, suppose that the present screen is making 3-in., 2-in., 1-in. and screenings, and that it is desired to make, in addition to these sizes, 1½-in. and ½-in. stone. This can be done by utilizing the present screen to take out the 3-in., 2-in., 1½-in. and all material below 1-in., and passing the latter grade into the auxiliary screen, which would separate it into screenings, ½-in. and 1-in., rejecting the last named at the discharge end.

Another way of increasing the capacity of, or the number of sizes to be made in the separating plant will suggest itself where a scalping screen is used between the primary and secondary crushers. This method involves the returning of the secondary crusher's product to the scalping screen, so that all of the material sent to the final screens will be below the largest size to be separated.

This layout will only be feasible when the secondary crusher can be set fine enough to make the reduction without cutting its capacity to too low a figure. The same method may be used between the primary or secondary crusher and the final rejections crushers. The efficiency of this arrangement should, however, be carefully investigated before adoption. It can readily be seen that the capacity of the separating plant will be increased without additions to that plant, as it will have but one pass of the stone to take care of, and it will not be necessary to provide perforations for the largest grade—this material being rejected at the discharge end of the screen. On the other hand, it involves the installation of an additional elevator to carry the stone from the small crusher back to the scalping screen. Whether or not the arrangement is justifiable will depend chiefly upon the height and distance of elevation from the initial crushing plant to the separating screens, and upon the amount of rejections to be handled.

When the plant is being enlarged throughout in connection with the installation of a larger primary breaker, the objections to the use of a scalping screen between the first and second crushers—mentioned under the head of "Primary Breakers"—do not hold good. In fact, the scalping screen will generally be found to be a most necessary adjunct in order to lessen the load upon the secondary machine. It goes without saying, that the installation of a scalping screen will generally involve an increase in the size of the elevator that must handle its output and that of the secondary crusher.

Rejections Crushers

Additions to the re-crushing equipment will generally be rendered necessary by any material increase in the plant's capacity. This brings up a problem that is getting to be a rather important one to many operators; namely, that of producing a larger percentage of medium and fine grades to supply the increasing demand for them for highway work. For this service the fine crushing rolls or the disc crushers are admirably adapted, and may be used either to supplement the small gyratory and jaw crushers, or to supplant them entirely for rejections crushing.

One of the troublesome conditions that the average quarry operator has to meet is the seasonal variation in demand for the different sizes of crushed stone. One way of meeting this situation is to provide stocking facilities; but stocking, with its attendant cost and tying up of material in which the operator's money has been invested, should only be resorted to as a last expedient; and judicious plant design is often effective in greatly decreasing the amount of stone going to the storage piles. The installation of fine-crushing units, even when their service is not required for the full season, may be warranted by the resource which they offer for producing large quantities of fine and medium grades of material when the demand for these grades is heavy.

These machines can be, and should be, so set that any grade larger than that which they are expected to produce can be fed to them, either directly from the screens or from the storage bins. Generally the former system is the better of the two. When it is adopted, a small bin should be erected over the crusher from which the material can be fed to it. During the periods when their service is not required the fine-crushers can be thrown out of duty by throwing off the drive belts; or a friction clutch may be provided for the purpose.

A very favorable feature of the double smooth-faced rolls is their wide range of adjustment and, consequently, their adaptability for producing any size which may be required of them. This feature will be found to be an especially commendable one where the rolls are used to handle all of the rejections crushing instead of merely supplementing the work of small gyratory or jaw crushers.

It should be borne in mind, when de-

termining the size of double rolls, that these machines have a definite limit in the grade of feed which they will take, depending upon the maximum angle of grip—this angle being a function of the roll diameter. The roll diameter should, therefore, be chosen with reference to the largest size of stone which the crusher is expected to handle. This point has a distinct bearing upon the efficiency of the machine and upon the life of the shells, and it is well to select a diameter that will give an ample margin of safety.*

Electrification

A factor that will have a very important bearing upon plant remodeling is that of power. Here, as in new plants, the superiority of the electric drive is clearly manifested, both as regards flexibility and economy. If the small plant, to which a larger breaker is to be added, is already driven by electric power, the new drive can be readily taken care of by the addition of another motor or two. On the other hand, the enlarging of a steam driven plant will generally require the purchase of a larger engine and more boilers—in fact, an increase in the steam plant equipment throughout. Also, in steam-driven plants, complications in power transmission are apt to be a serious restricting factor in the disposition of the new machinery.

Altogether, there are just as many reasons in favor of small plant electrification as there are in favor of driving the big plant electrically. This does not mean, of course, that it is always as practicable for the small plant operator to electrify, as, for instance, where it would involve the installation of an expensive power station at the quarry. But, if electric power from a central station is obtainable within a reasonable distance of the quarry it will certainly pay the operator to investigate thoroughly the possibilities in this system of drive, not only for the plant itself, but for other machines in the quarry.

General

Plant remodeling and its problems should be gone into as carefully and as thoroughly as new designing. We are just as liable to make costly mistakes in the one as in the other, and remodeling is generally productive of more perplexing situations than is new design. The old catch-phrase anent the fitting of a round peg in a square hole finds its analogy with rather irritating regularity.

In the figuring up of cost estimates on remodeling work, the designer must take into consideration not only the cost of the work in the plant, but also the cost of any other equipment that may be necessary. For instance, if it is proposed to increase the production, it may be necessary to add drills, cars, locomotives, etc., to the quarry equipment. More drills may mean a larger air compressor: a larger air compressor may involve the purchase of more boilers: the introduction of more motors may entail larger transformers: more track room may be necessary, etc.

It is better to look these additional expenses in the face and to provide for them than it is to be hampered by a weak point in the equipment later on when there may be neither time nor money available to rectify the mistake. The full benefits of plant remodeling cannot be realized unless the rest of the equipment is brought up to the same standard of efficiency that is expected of the plant.

It is frequently advantageous to discard some of the old equipment and to replace it with equipment of a type that is better adapted to new operating conditions. It is hardly wise, however to reject old material promiscuously without careful consideration of whether or not the superiority of the proposed new equipment is sufficient to warrant the expenditure. For instance, when changing from the incline to the crusher-pit type of plant, it is generally best to replace the end dump quarry cars with side dump cars, as the side dump car is better adapted for serving the latter type of plant. Nevertheless, it is not always necessary that the change be made, and if the present equipment is in good condition, it is doubtful whether anything will be gained by throwing it aside, unless the capacity of the plant is so high that the old cars could not be handled fast enough through the crusher house.

The use of the end dump cars in connection with pit installations involves the employment of some type of tipple or car dumper, which means that the cars must be cut loose from the train, and re-coupled after dumping. This is a slower operation than the dumping of the other type of car, and requires more men for its performance; but the work can be expedited, and the number of men required will be lower, if the tracks are properly arranged and machinery is used to handle the cars to and from the dumping device.

Before installing any heavy new machinery in an old building it is well to thoroughly investigate the strength and condition of the members which will have to carry the additional load. The writer has remodeled plants where apparently sound timbers were found to be nothing but thin shells filled with rotten punk. If there is any evidence of springing or cracking of the posts which carry the bins and screen room they should be reinforced before superimposing any further load upon them. An excellent method of reinforcement is to construct a concrete wall around the posts, bringing the top of the concrete up under the girders which carry the floor beams.

A prolific source of trouble in timber-frame crushing plants is the springing of the wooden bin floors. This is sometimes due to careless designing and sometimes to poor timber, probably as often to the one as to the other. Moreover, the timber floor is subject to deterioration by the process of wet rotting, owing to the dampness of the stone on rainy days. This rotting generally starts in the upper fibres of the timber and works its way downward gradually, lessening the effective depth of the beam as it goes. The action can be checked by thoroughly coating the floor with pitch or by using treated timbers. The surest way of ending bin floor trouble once and for all is to construct the floor of steel or reinforced concrete.

Timber buildings have a way of sagging and settling out of true, on account of the heavy loads and racking of the machinery. When remodeling the plant, a little time should be spent in checking up the machinery and shafting, releveling and realigning where necessary. Nine times out of ten, when trouble is experienced with hot bearings, it can be traced directly to poor alignment, and it is hardly necessary to mention the fact that it takes power to generate heat by friction, which means the loss of just so much power.

The operator who is remodeling his plant will naturally wish to keep the cost of the reconstruction as low as possible. It is possible to accomplish much in the way of remodeling with the expenditure of a very moderate sum, if care is taken to make the installation as simple as is consistent with good engineering. On the other hand, nothing should be neglected that will bear upon the efficiency of the plant. Make the machinery accessible for inspection, oiling and repairs; and provide proper guards and runways for the men who operate the plant. Most old crushing plants would be materially benefited if a few large windows were provided instead of the tiny portholes which seem to have been popular when the plants were built.

In closing, the writer wishes to lay especial emphasis on the fact that the majority of old crushing plants—and some of the more modern ones—are very poorly equipped for handling the heavy machinery parts when making repairs or replacements. This is rather surprising in view of the fact that no item of equipment will pay for itself more surely than the right tackle and proper disposition of the same, in order that repairs may be made quickly on occasion.

*For a full discussion of this point see the article on "Operation of Quarries and Crushing Plants—Types of Crushers," by R. W. Scherer, in Rock Products, Feb. 26, 1919, p. 22.

Sand and Gravel Producers Plan a Record National Convention

Many Important and Interesting Problems to be Discussed—Reasons Why All Producers Should Attend

AN INTERVIEW with Burton H. Atwood, president of the Interstate Sand & Gravel Co., Chicago, and chairman of the 1920 convention program committee, and a director of the National Association of Sand and Gravel Producers, discloses plans maturing to make the fourth annual convention of the National Association, to be held February 11 and 12 at the Sherman Hotel, Chicago, the largest and best yet.

B. H. Atwood

Mr. Atwood states that there are four real reasons why a National Association is more imperative at the present time, than ever before, and why every producer should aid and share in the results of national co-operation.

The most vital instrumentality in the sand and gravel industry is transportation. Many phases of the transportation problem in the future will probably be directed by committees or bodies of men representing the entire railroad system as a whole, or at least large groups of railroads. The most efficient way of dealing with the matters under the control of these committees will be by a national association.

United effort enables constructive work in the solution of various problems. Such problems facing the sand and gravel producers of today are gradation of aggregates, a uniform specification and promotional development to introduce and defend the use of sand and gravel in new fields.

The work under way by highway officials and other organizations indicate that eventually there will be a standard specification for sand and gravel, and in order that these interests of the producers of the country be represented there must be national co-operation and action.

In order that there be a ready means for an exchange of ideas upon operating questions an organization, national in scope, is necessary. Such questions as cost accounting, labor questions, etc., are advantageously discussed.

No operator of the sand and gravel industry should let this opportunity pass of attending the national convention, said Mr. Atwood, as it is the past experience of those who have attended, that the dollars and cents value of the new ideas gathered is commensurable with the time lost and expense incurred by attending. It is planned that this convention will deal exclusively with the problems vital to the industry as a whole, and to the producer as an individual.

Papers are being prepared by men of experience in the business, and since they will be telling of their own work, the talks will be practical and not theoretical. It is proposed that one paper be delivered by a man well informed on transportation, which will tell of the gravel man in his relation to transportation problems. The two days have been divided into four sessions, at each one of which will be discussed one of the following topics: (1) the gravel man and his relation to transportation; (2) the gravel man in his relation to the consumer; (3) the gravel man in his relation to labor, and (4) operation problems.

The transportation problem will probably be discussed from the standpoint of railroad legislation, theory of rates, and car distribution. Under relations with the consumer, will come specifications, gradation, standardization and uses of the material.

The country-wide labor unrest has caused all industries much concern. At this time labor problems, including profit-sharing plans, will be presented by men in the business who can give their experience with the working out of some of these plans. Under operating methods a paper will be presented on the hydraulic method of material handling. A report will be made of the tests on Indiana sand and gravel, made at Purdue University, W. La Fayette, Ind.

Including the reports of committees and officers, the time for general discussion, regular business meeting and the election of officers, the two days will be more than full. Mr. Atwood earnestly urges all to come.

Secret of Successful Sand and Gravel Pumping--the Pump

Coon River Sand Co., Des Moines, Iowa, Profits by Several Years' Experience in Dredging Operations

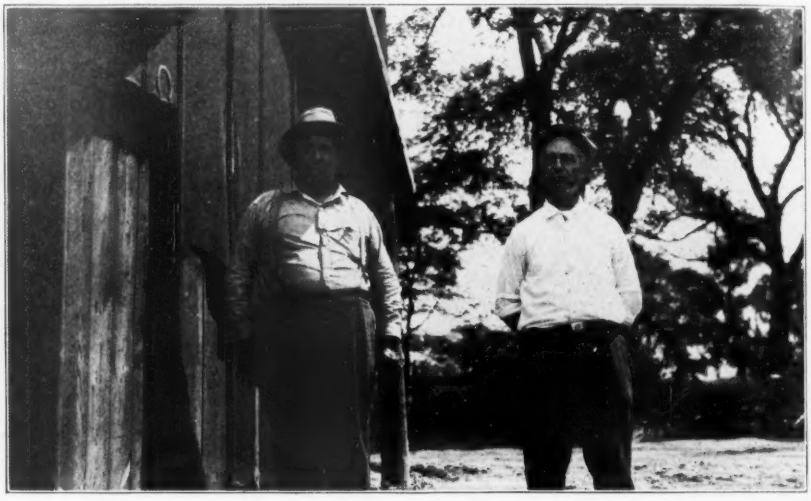
SAND AND GRAVEL PLANT methods of operation often develop by districts. We often find a district where the original operator made a success of a dragline operation, and we find that in nearly every instance his subsequent competitors have adopted the same method of operation. Another district, under similar conditions, may depend entirely on bucket or ladder-dredge operations, while operators in a third district will devote their energies to hydraulic or suction dredges.

There does not seem to be very much study and investigation on the part of prospective operators as to which of the various methods is best adapted to their particular material, or to their particular location. Other items, besides the actual cost of removing the material from its deposit, count for so much it is doubtful if any dependable comparison of costs has ever been made, or can be made without considerable time and trouble, and the whole-hearted and disinterested co-operation of producers.

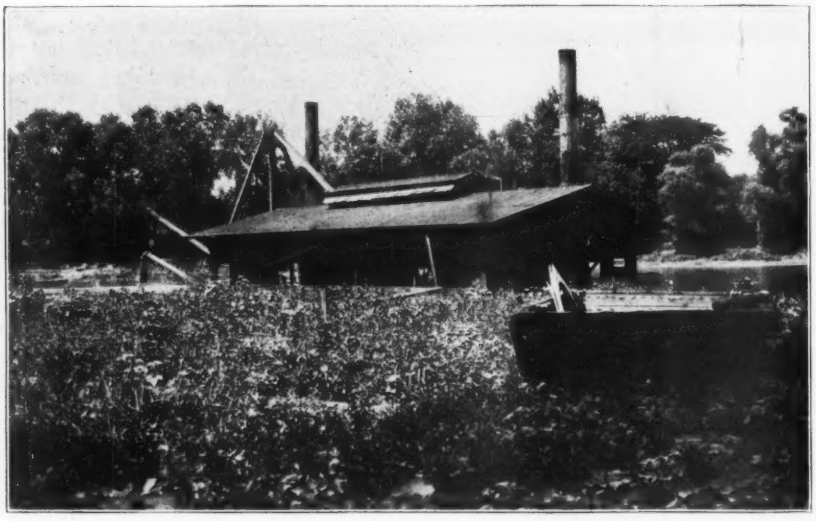
Generally speaking, it is conceded among engineers and contractors who have had extensive experience in excavation work, that there is no cheaper way of handling the material than by hydraulic methods. There are many instances to prove this contention, and in nearly every case where earth is to be moved in large quantities, it has been done by sluicing with water, or by pumping, wherever these methods are physical possibilities. How far this holds true as the material becomes coarser, like gravel, is a debatable point.

However, many operators have been very successful in pumping gravel as coarse as 4 to 6 inches in size. But in every case it will undoubtedly be found that the operator had, or has acquired, a considerable knowledge of pumps and dredging. It is certainly very risky for an operator, without dredging experience, to embark in this business off-hand. There are many pitfalls in it. The installation of a pump with an alloy-steel casing, which wears out and has to be replaced every month or six weeks, will certainly offset any advantages in dredging over other means of excavation.

R. Snoddy, manager of the Coon River Sand Co., Des Moines, Iowa, is perhaps one of the most successful, as well as one of the most experienced operators in the Middle West. His pumps are designed by him and built at a local foundry from his own patterns. His pump casings last several seasons, instead of weeks. The reason, he says, is because these pumps are designed to handle his particular material, which by long experience he has come to know intimately. His pump is the result of practical experience, and not at all of mathematical calculation—which does not mean necessarily that mathematical and theoretical considerations would not improve it, but the fact remains that it is a very successful pump for his particular material.



Coon River Sand Co.'s head teamster (left), and its genial general manager, R. Snoddy (right)



One of the dredging plants of the Coon River Sand Co., Des Moines, Iowa

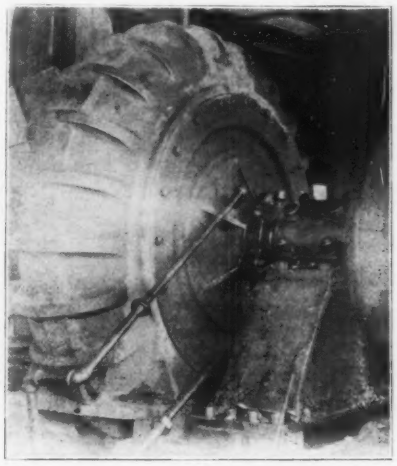
Mr. Snoddy says the key to successful sand and gravel pumping is in keeping the pumped material in suspension inside the runner, instead of grinding out the casing by throwing the gritty material outward against the pump casing. Of course, this is no secret, since it is what every sand pump designer aims to accomplish. The

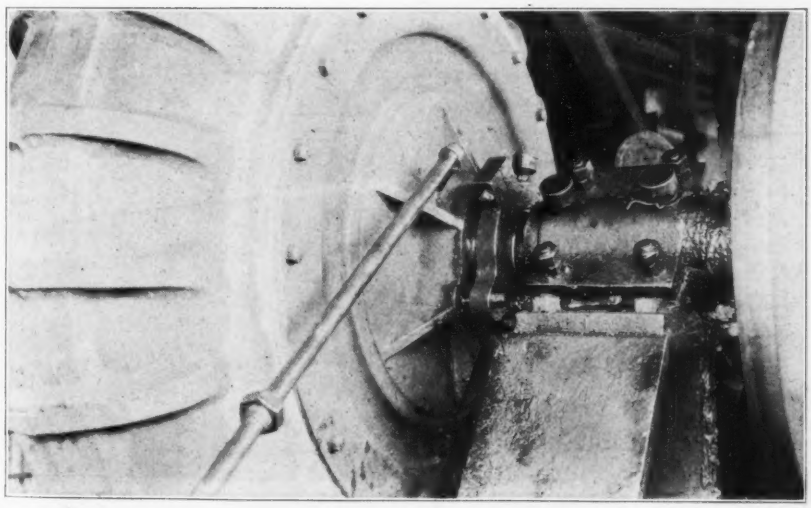
point is that Mr. Snoddy does accomplish this end, as the life of his pumps shows, while many operators under exactly similar conditions, wear out a manganese-steel pump casing in as many months as Mr. Snoddy's ordinary cast-steel casings last in years.

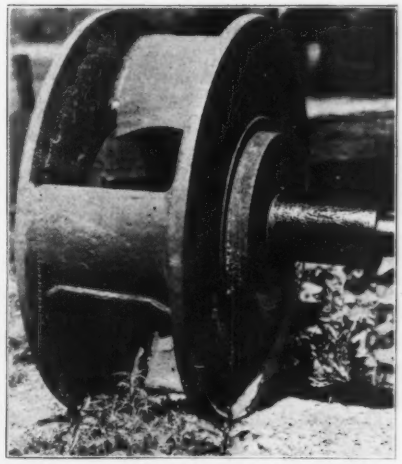
The moral of this little tale is not to design and build your own pumps, which may be very inconvenient, nor is it to use Mr. Snoddy's design, necessarily, since it doesn't exist in the form of working drawings, and he is not in the pump business, anyhow. Moreover, there is no assurance that his design would be best for all materials and all conditions. The real moral is to know your material and to know your pump, and be sure these same pair properly to produce a maximum amount of material at the lowest cost of operation!

Shore plant of river dredging operation

The material pumped at Des Moines carries a large amount of sand in proportion to the gravel. This is undoubtedly an important factor in selecting the type of pump. Certain special features of Mr. Snoddy's pump are shown in the illustration below. Its most important feature is the extreme simplicity of the design as a whole—a most desirable feature to be sought after.



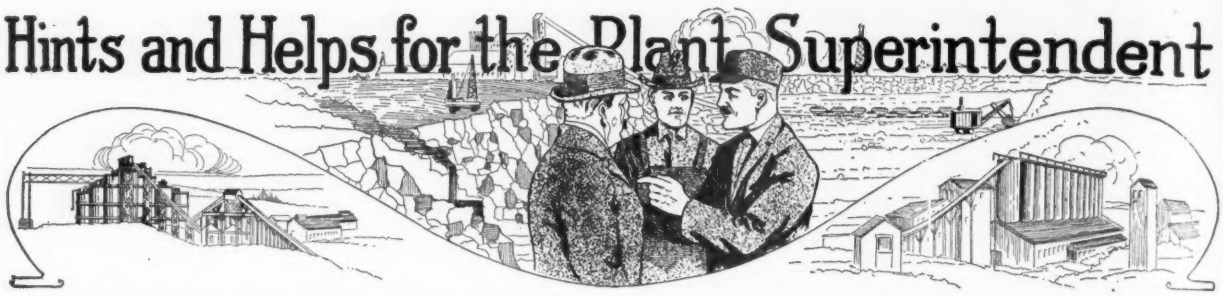




Various views of special sand and gravel pump built according to General Manager Snoddy's specifications

Upper row—Two views of the pump casing and discharge pipe connection; the pump in place. Lower row—Special gland arrangement; pump runner, showing special replaceable collar on runner shaft, which takes the wear instead of the shaft; this collar can be shrunk on in a few minutes by an ordinary blacksmith

Hints and Helps for the Plant Superintendent



Sampling Gravel Deposits

INQUIRIES are reaching ROCK PRODUCTS frequently regarding the best method of testing or sampling sand and gravel deposits for determining the commercial possibilities of the material.

Many experienced operators will not develop a deposit which has not been thoroughly explored by means of pits or wells large enough for actual inspection of the material in place. This is necessarily quite expensive.

A quick and fairly satisfactory method

Scheme for sinking test pits in gravel deposit

for a preliminary test is to drive six or four-inch iron pipe into the deposit at various places, pull out the pipe and knock out the sample.

R. Snoddy, general manager, Coon River Sand Co., Des Moines, uses a small orange-peel bucket operated from a tripod or frame, and sinks a well inside of a sewer pipe lining. This method has been used with success in sinking wells for water supply, where the pipe is left in place, but Mr. Snoddy withdraws the pipe sections and uses them in another place.

Orange-peel buckets as small as eight-inch spread can be had; these will work nicely in a 12 or 14-inch pipe, although a larger diameter pipe will prove more satisfactory. The size, of course, depends on the size of the gravel encountered.

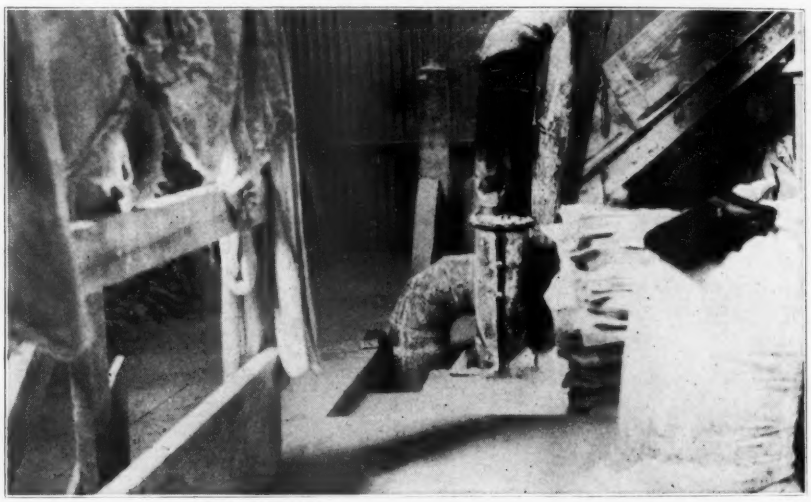
Dust Collector in Lime Plant

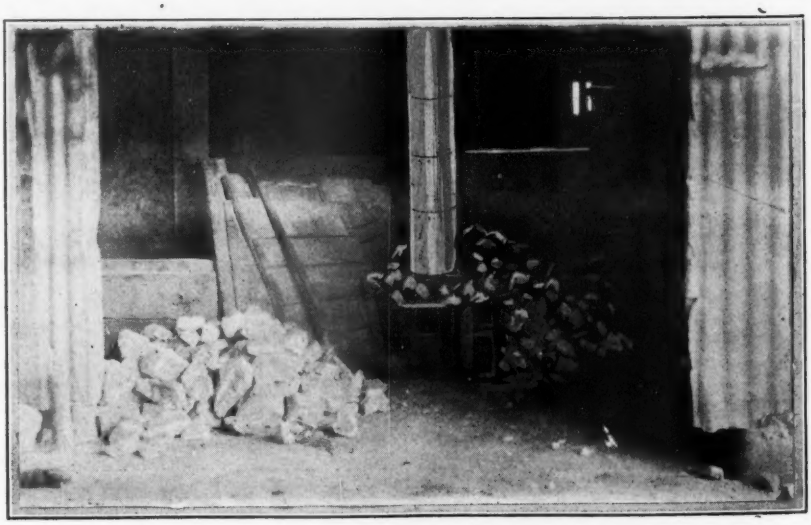
THE TWO VIEWS below show a scheme for collecting lime dust employed at the plant of the Steacy & Wilton Co., near Hanover, Penn.

The lump lime from the kiln is brought in wheel barrows to an elevator pit on the ground floor of the hydrating plant. Directly over this pit is the intake of the small suction fan on the floor above.

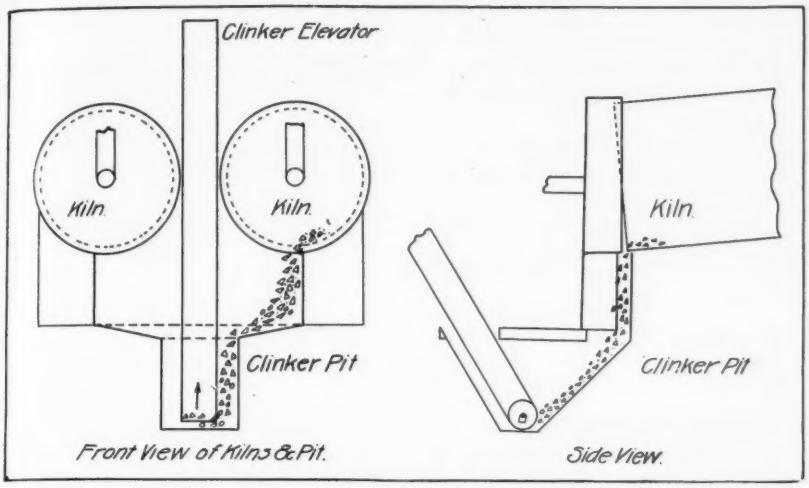
The lime dust collected in this manner is discharged into the pulverized lime bin, which feeds the hydrator. The fan also has an intake near the packing-room floor, on which the fan itself is mounted.

A somewhat similar scheme of dust collecting at the kilns of the Palmer Lime & Cement Co. plant was described in ROCK PRODUCTS November 22, 1919, page 27. Other plants use suction intakes below their bagging machines to avoid dust in the packing rooms.





Dust elimination in a Pennsylvania lime plant



Clinker-handling pit and elevator arrangement

Handling Cement Clinker

THE CAPE GIRARDEAU PORTLAND CEMENT CO., Cape Girardeau, Mo., has devised a method of handling the hot clinker from the cement kilns to the clinker storage elevator without the use of a conveyor across the ends of the kilns.

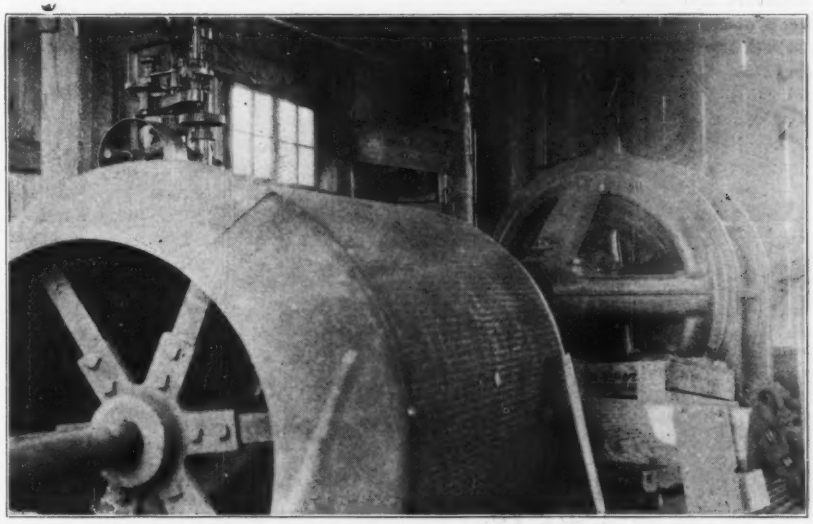
The hot clinker falls from the ends of a pair of kilns into a pit, the bottom of which is sloped so that the material from the two kilns is directed to a single chain-bucket elevator.

It is claimed that this method is superior to the arrangement of collecting the clinker by a pan conveyor under the ends of the kilns.

The accompanying sketch shows the method used by this company. It will be readily seen that the installation cost is much less than for the usual method, and there is claimed to be a saving of the power and up-keep costs.

Increasing Efficiency of Sand Screen

IT IS PRETTY generally conceded that the ordinary cylindrical screen, when used with a very wet mixture of sand and water, does not screen out all the fine gravel. R. Snoddy, manager of the Coon River Sand Co., Des Moines, Iowa, has increased the efficiency of his fine gravel screen by a funnel-shaped apron on the discharge end, which prevents the sand and water mixture rushing through before the screen has performed its duty.



Increasing efficiency of sand screen by funnel-shaped apron

Circular System of Storage

THE VIEW to the right shows the agricultural limestone plant of the Solvay Process Co., Jamesville, N. Y. The view was taken from the crushing plant on the side hill above and shows the system of storage for several thousand tons of limestone screenings. These screenings are removed from the crushing plant and moved to the plant shown in standard railway equipment. These cars are unloaded and the plant hopper fed by a locomotive crane on a circular track.

Limestone storage by circular track and pile system

TO ALL PLANT SUPERINTENDENTS

THIS is the season of the year when you have a little time to think things over and make plans. You must have developed some kink, of interest to other operators, during the past year. They want to know about it; and you want to know theirs. Rock Products pays plant superintendents $2 each for letters describing these plant-operating kinks.

Latest Development in Wet Process Portland Cement Plants

Indiana Portland Cement Company Plant at Greencastle Typifies Recent Progress in Cement Plant Construction

ONE OF THE MOST INTERESTING developments in the cement industry since the end of the war has been the completion of the Greencastle plant of the Indiana Portland Cement Co. and its entrance into the field of producers. This plant represents the experience of Adam L. Beck, one of the most experienced operators in the lime and cement industries and of F. L. Smidth & Co., engineers and builders of some 130-odd wet-process cement plants in nearly all parts of the world, who state: "This plant embodies the latest improvements of machinery and devices for the manufacture of portland cement."

The plant is laid out to furnish a capacity of 1200 to 1500 bbls. of cement per 24 hours, and has been designed throughout for compactness and ease and economy of operation. The cycle of operations and the method of handling the material as it passes through the process of manufacture are detailed below. For this information and the drawings of the plant, ROCK PRODUCTS is indebted to F. L. Smidth & Co. The views shown are from photographs taken by the editor and are published by kind permission of Mr. Beck.

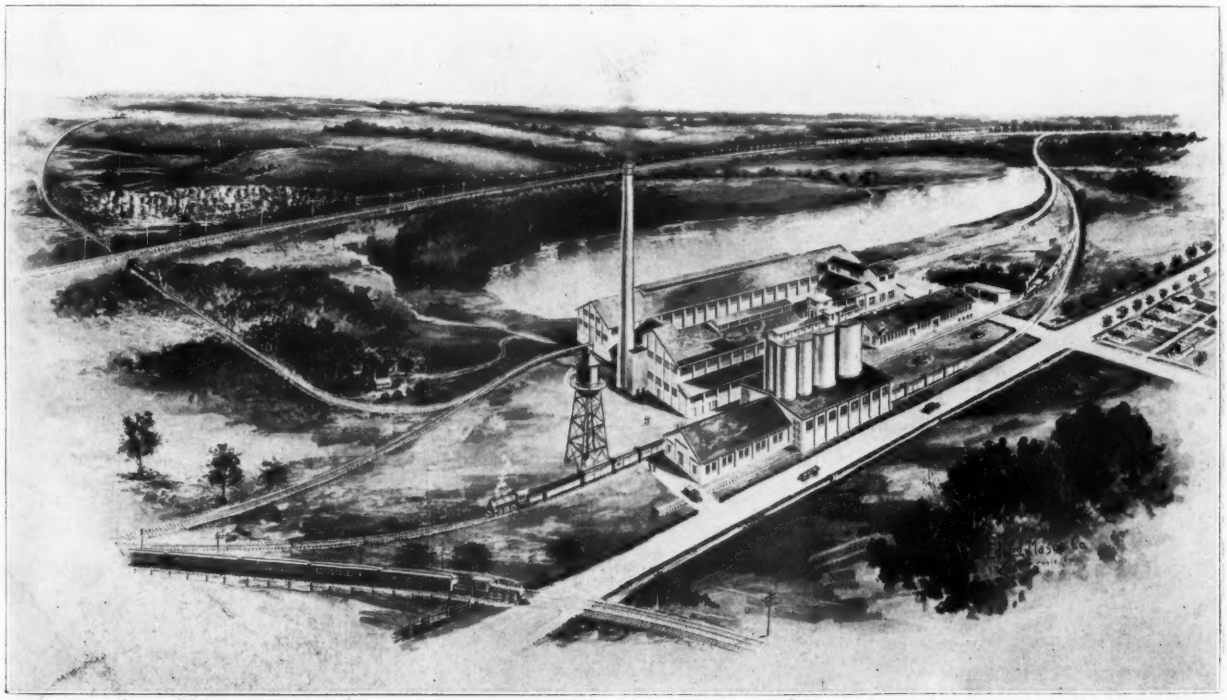
Raw Material Handling

The raw materials consist of limestone and a small percentage of shale and clay. The proportion being approximately 78% to 11% to 11%. These materials are brought to the plant in standard hopper-bottom dump cars of a capacity up to 50 tons per car. These cars are hauled on a slightly inclined embankment to a trestle passing throughout the storage building, and the limestone, shale, clay, gypsum and coal are dumped in the respective pockets in this building. The building is equipped with an overhead 10-ton electric traveling crane with a 3½-cu. yd. bucket, which distributes the material throughout the building and in the various elevated bins along the west side of the building. From these bins the material is fed to the respective mills by elevators and conveyors.

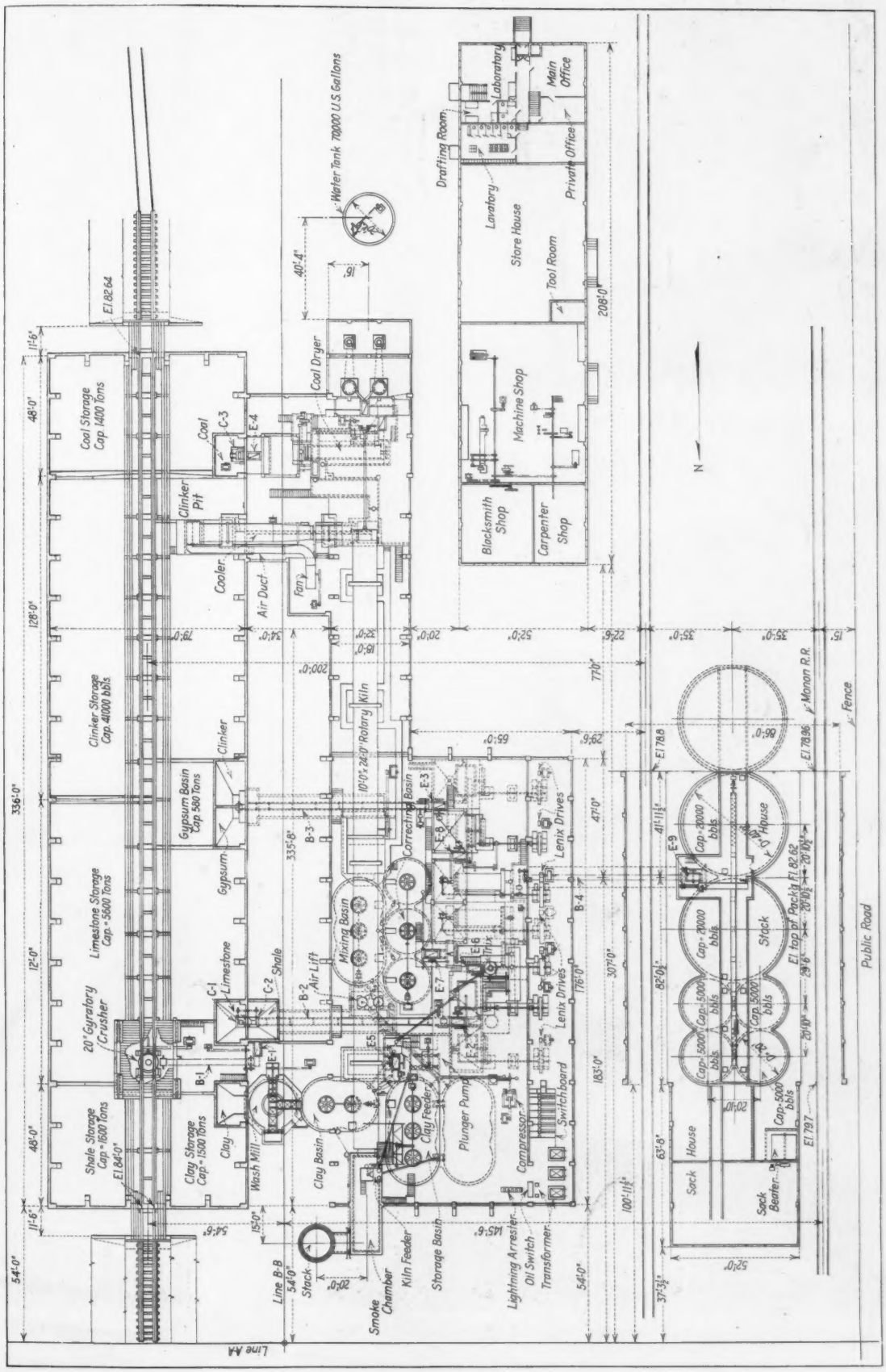
All of this material can be handled by the crane, which will be operated through the 24 hours of the day. Thus, the clay will be fed by the hopper or chute marked "Clay" directly by gravity into the washmill. The limestone which arrives at the plant at a size of 2- to 3-ft. cubes is dumped from the cars directly into the gyratory crusher and by means of a belt conveyor B-1 and elevator E-1 is deposited in the limestone bin. The bin is so designed that the crushed rock is permitted to overflow into the limestone storage for crushed rock and distributed by the traveling crane in its subsequent handling.

The shale is handled in a similar manner and deposited in the shale bin.

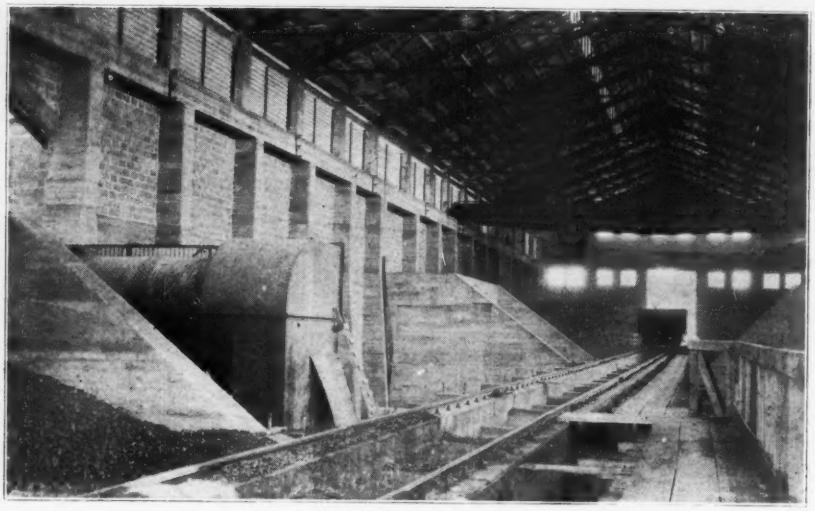
These two materials are fed by means of the cradle feeders C-1 and C-2 in the correct proportion of the mix. A belt conveyor, B-2, and elevator, E-2, convey the material to the reinforced-concrete kominuter bin in the raw mill building. The gypsum and clinker are handled in the same manner and are conveyed by



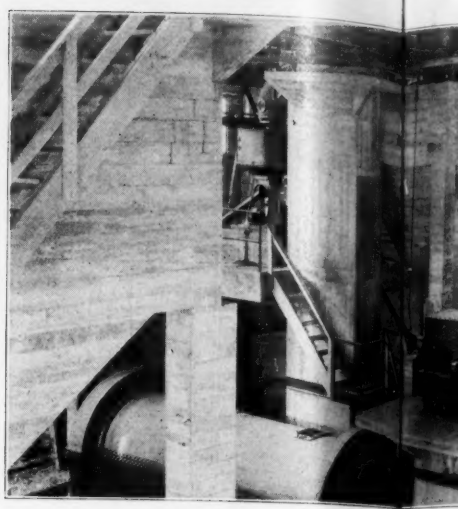
Birdseye view of new plant and quarry of the Indiana Portland Cement Co., near Greencastle, Ind.



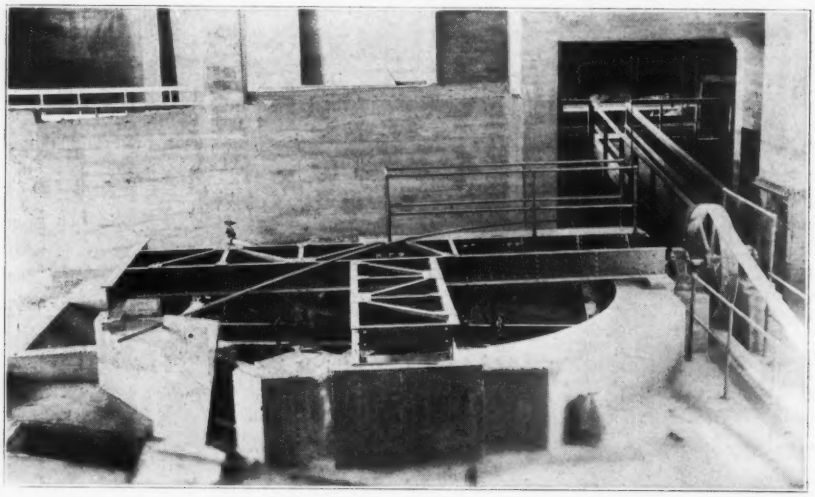
General plan of the plant of the Greencastle Portland Cement Co.—Stock house for raw materials above, kiln room and mill in the center, and cement storage bins and packing plant below.—Note that packing and storage plans are one and the same



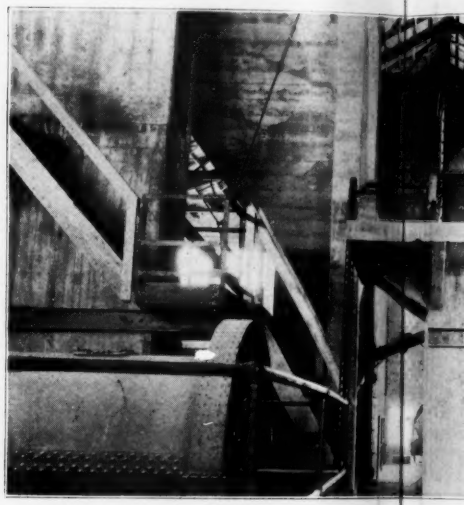
Raw material stock house—End of rotary clinker cooler on left



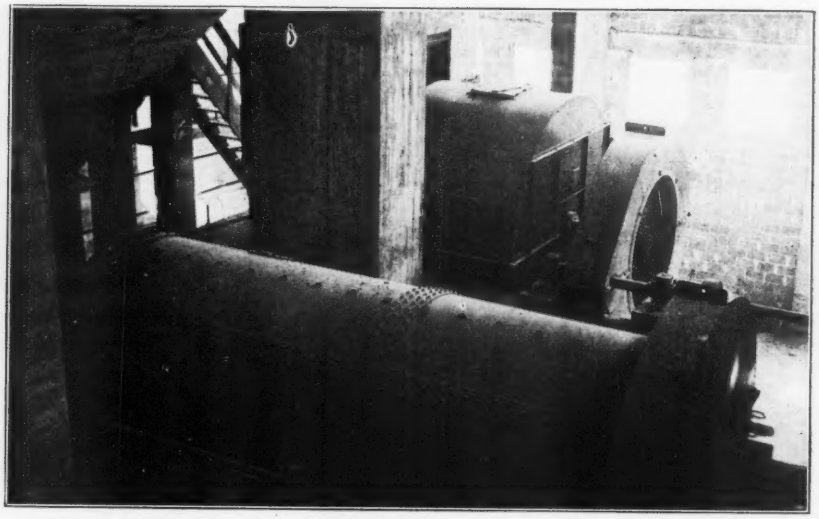
Raw material grinding—Trix screen, left—



Clay wash mill—runway and opening into raw material house

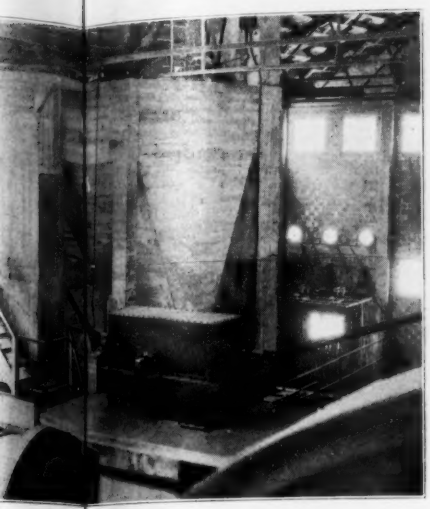


Note reinforced-concrete structural deta

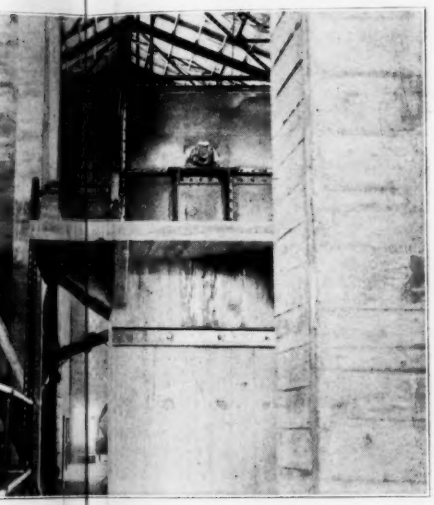


Raw material kominuter and tube mill—concrete enclosed elevator—concrete hopper for tube mill feed

Slurry correcting basins—walls in backg[illegible]nd are c[illegible] look like tile

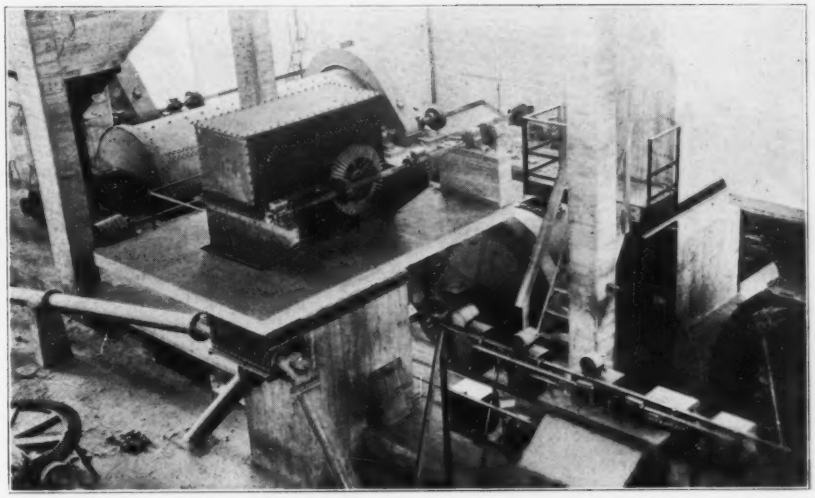


g—Trix screen, left—Switchboard, right

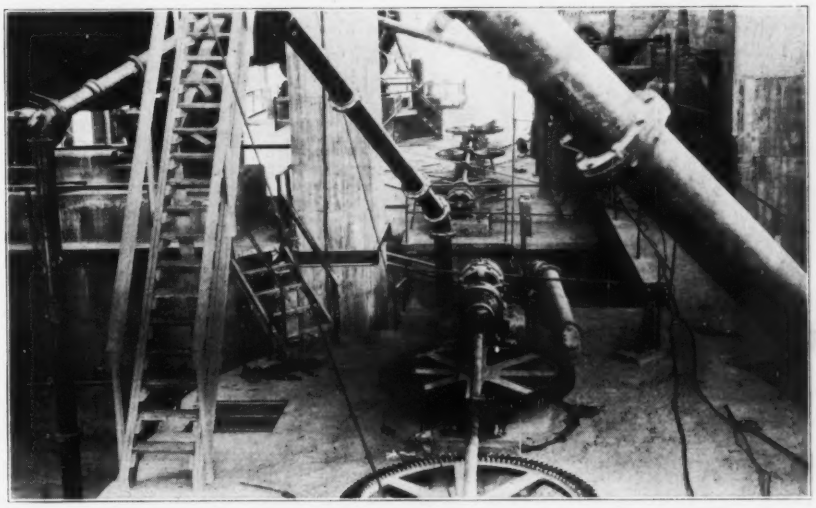


oncrete structural details throughout

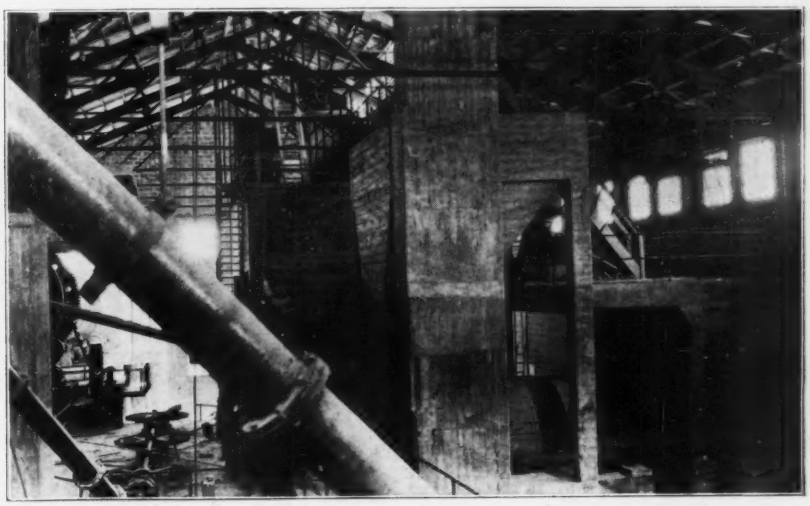
in background are concrete block, although they look like tile



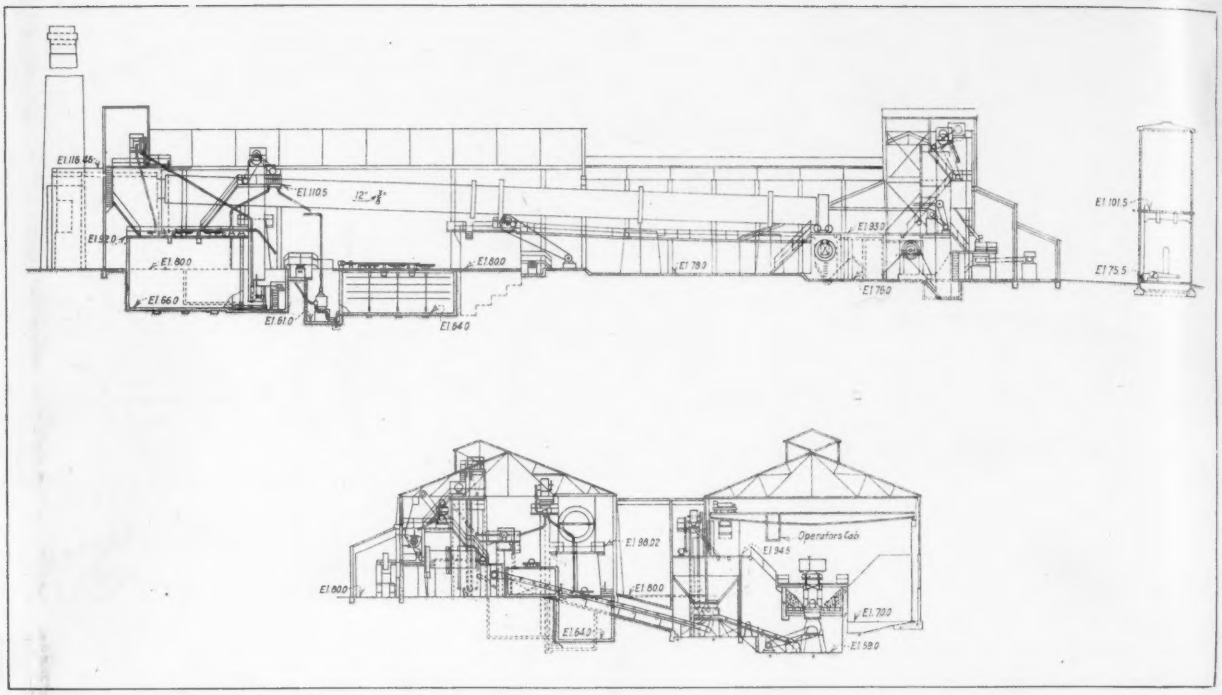
Elevator E-7 from tube mill to correcting basins



Slurry mixing basins in background; storage basins in foreground



General view of raw material grinding end of mill; pipes in foreground carrying slurry to kiln



Elevation of the kiln room and cross-section through raw-material stock house and kiln room

means of a belt conveyor, B-3, to the elevator, E-3, alongside the kominuter bin in the grinding mill building. The coal is also fed to a crusher, C-3, beneath the bin discharging into the elevator, E-4, alongside the bin over the coal dryer, which is fed by means of a cradle feeder.

After the clay has been disintegrated in the washmill, where it is mixed with water to a content of 50 to 60% of water by weight, it is discharged by gravity into the clay basin. The bucket elevator, E-5, elevates the clay to a feeder tank, which feeds the clay slurry to the raw material kominuter and passes the overflow back to the clay basin.

Slurry Handling

The kominuter is fed simultaneously with the crushed shale and rock from elevator E-2 and the mixed raw material, after passing through the preliminary grinder, the kominuter, where more water is added, passes by means of elevator E-6 through a vertical rotary screen called the "Trix," and from thence is fed by gravity into the tube mill.

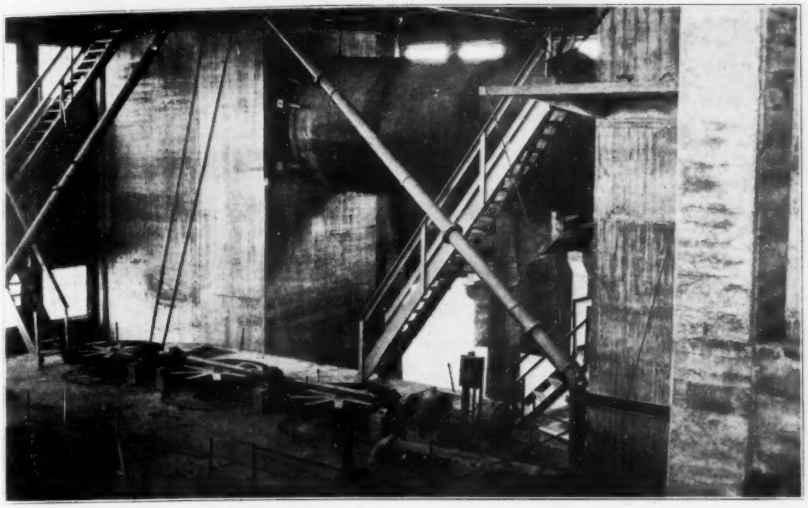
After the slurry has been finely ground in the tube mill, it is elevated by means of elevator E-7 and discharged into the three-unit correcting basins. The function of these three circular basins is to give the chemist an opportunity of testing and controlling the raw mixture before it is discharged into the mixing basin under the rotary kiln. From the mixing basin the raw mix is pumped, by means of an air-lift pump, to the storage basin west of the inlet end of the rotary kiln and is pumped by means of a duplex plunger pump to the feed tank over the inlet end of the rotary kiln; the overflow is passed back to the storage basin.

Clinker Handling

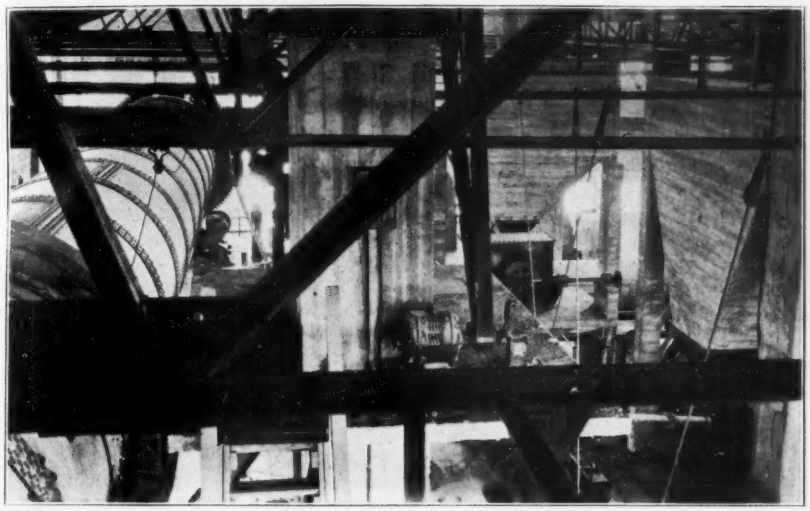
After the slurry has been burned in the kiln, the clinker is discharged by gravity into the rotary pressure cooler located at right angles to the rotary kiln with its discharge end in the storage building. The cooled clinker thus falls by gravity from the outlet end of the cooler into the storage compartment for clinker and by means of the traveling crane is distributed in the clinker storage.

The cooled clinker is picked up by means of the traveling crane and conveyed by belt conveyor, B-3, as already described, to the clinker kominuter in the mill building. From the clinker kominuter it is elevated by means of elevator E-8 to the clinker tube mill and the finished pulverized cement is thence conveyed by belt conveyor, B-4, in a tunnel under the railroad tracks to elevator E-9, and by means of screw conveyors on top of the silos, distributed to the respective silos. These silos are elevated

Belt conveyor and elevator for limestone crusher product—delivering to elevated hammer mill (C-1 on plan)

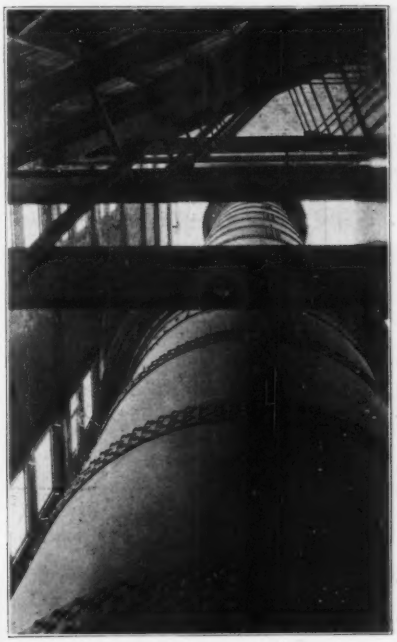


Slurry storage tank and feed end of 240-ft. kiln

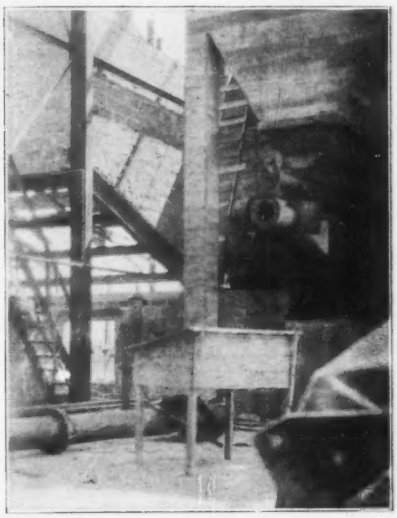


Kiln at left; clinker grinding plant in background at right

Pulverized coal burner and feed hopper; variable-speed disc drive for coal and air supply



Kiln 240-ft. long; 10-ft. inside diameter

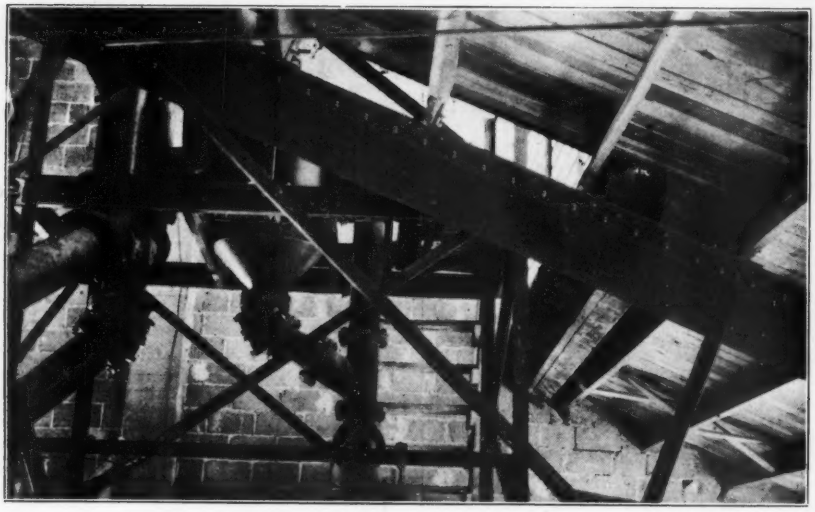


Another view of pulverized coal burner and reinforced concrete feed hopper

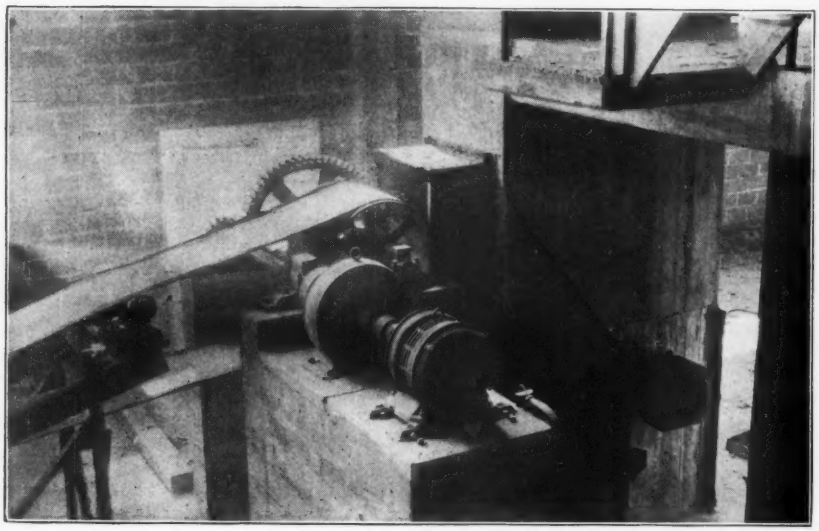
from the ground in such a way that the automatic packing machines can be located under the bottom outlet openings of these silos and the filled sacks or containers loaded directly to the cars without trucking.

The accompanying plans show also the office and laboratory building, store house, machine shop, blacksmith shop and the carpenter shop all under one roof. The plant is equipped with a water tank with a storage capacity of 70,000 U. S. gallons. The water is drawn from a nearby storage reservoir by means of an electric pump outfit operating automatically to the tank.

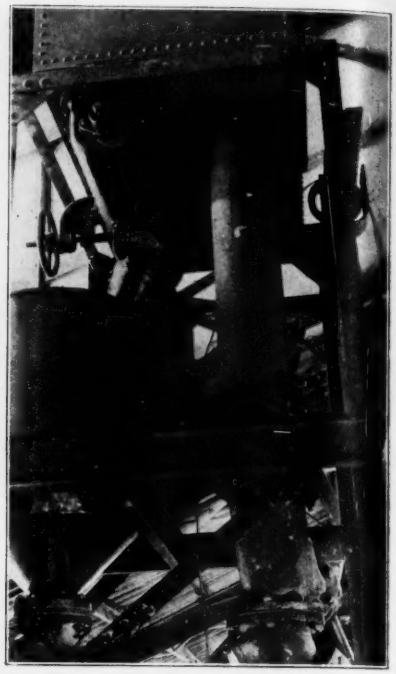
Concrete enclosed elevator E-5 and clay-feeding device



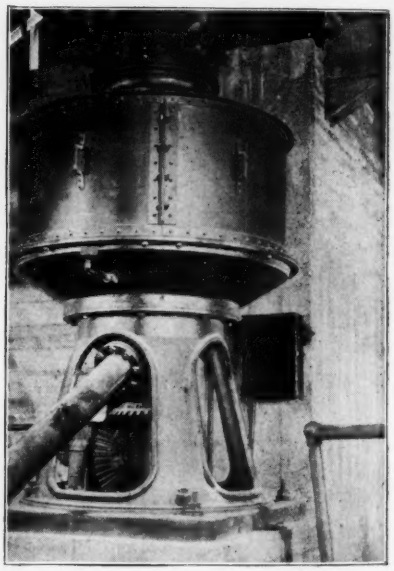
Device for feeding constant quantity of slurry to kiln



Belt conveyor for gypsum, showing method of direct motor drive through reduction gears



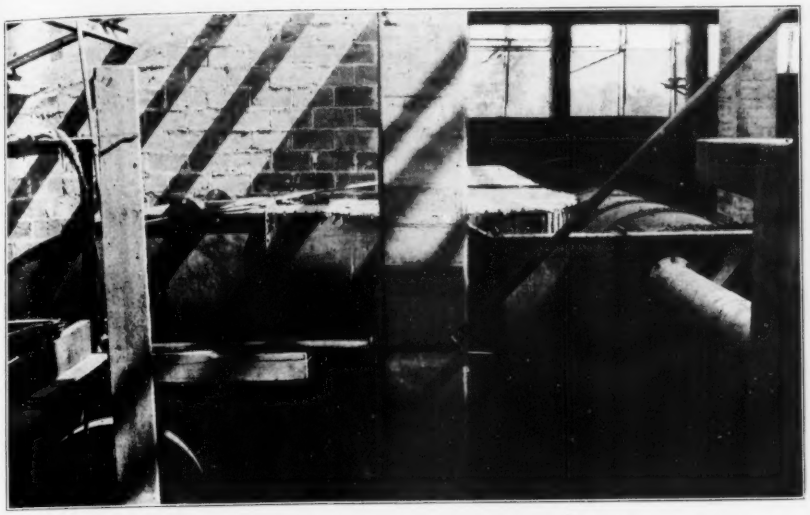
Another view of slurry feeder to kiln



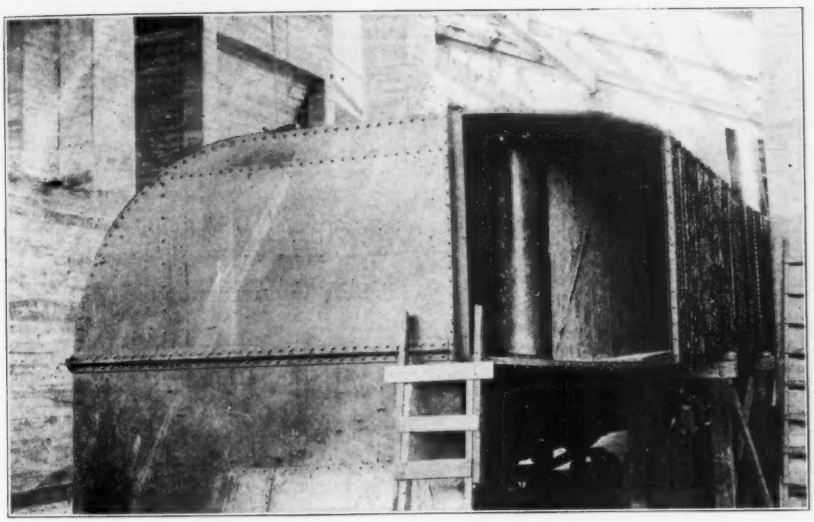
The "Trix"—vertical cylindrical wet screening device

Special Features—Changes and Additions Possible

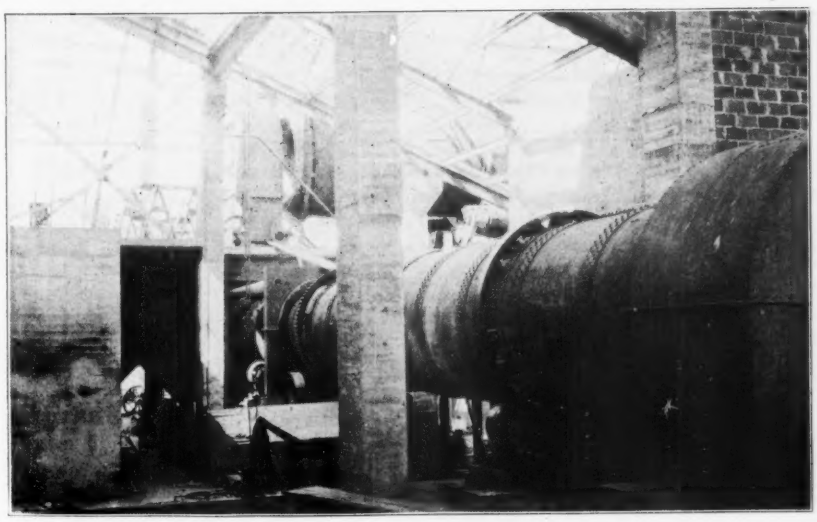
The layout shows one raw material kominuter in full lines and space is indicated by dotted lines for another raw material kominuter which may be installed in the future. The layout shows in full lines one tube mill for the raw grinding and one tube mill for grinding the clinker. Between the two is shown in dotted line space for a third tube mill, which may be put in in the future if desired for grinding clinker.



Concrete-covered duct taking hot gases from clinker cooler (on right)



View of duct at point of intake at clinker cooler



Clinker cooler with discharge end of kiln in background

Likewise, space is also provided for an additional kominuter for clinker grinding should it be desired to install it later on.

All the electric motors operating the grinding mills are in one motor room separated by a partition wall from the grinding mills. This motor room also contains the main switchboard and the transformers and thus gives the operator full control and free view of the starting and stopping of the large motors operating the grinding machinery.

Space has been arranged for the future installation of an additional triple storage basin for slurry. This is shown in dotted lines west of the triple storage basin alongside the inlet end of the kiln.

The smoke chamber and the kiln stack are so designed and laid out that it is possible in the future to install a potash plant, should such prove to be an economical measure.

In this instance, the owners did not wish the layout to be arranged for the future installation of another kiln, which explains the close proximity of the storage building to the kiln building.

The location of this plant is such that it will supply a local market mainly by means of auto truck service and the owners are of the opinion that it will pay them to put up another plant of similar size in another locality, rather than provide the additional space and buildings which would be necessary for doubling the output at a future date.

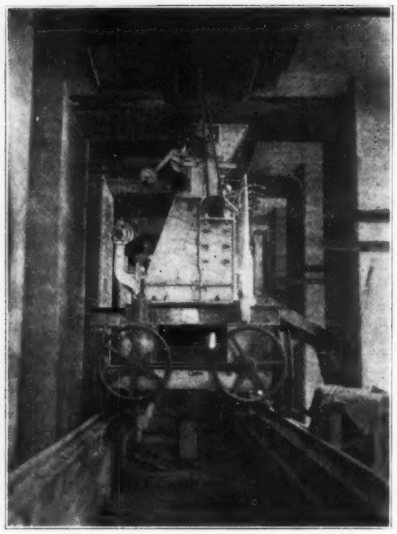
Fuel Handling and Drying

The coal mill consists of a coal dryer and two high-speed grinding mills which pulverize the finely crushed coal.

The clinker cooler consists of a steel shell lined with hard iron lining plates laid with an annular space between the liners and the steel shell. The large fan shown on the drawing forces air under light pressure not only to cool the clinker but also to protect the cooler against warping and deterioration, due to the red-hot clinker it receives from the rotary kiln. Part of the air used for cooling the clinker is used for combustion in the kiln and part of it for drying the coal in the coal mill. This is accomplished by a series of hot-air ducts and dampers which control the necessary amount of air for the kiln and the coal dryer. The air emanating from the cooler has a temperature of 600 to 700 deg. F., hence the heat units contained in this air are utilized to best advantage in reducing the coal bill for burning the clinker and for drying the coal.

Large Capacity Slurry Tanks

Aside from the advantages of the correcting, mixing and storage basins in controlling the composition of the slurry, they offer considerable storage capacity in that the correcting basins will hold an amount of slurry equivalent to the



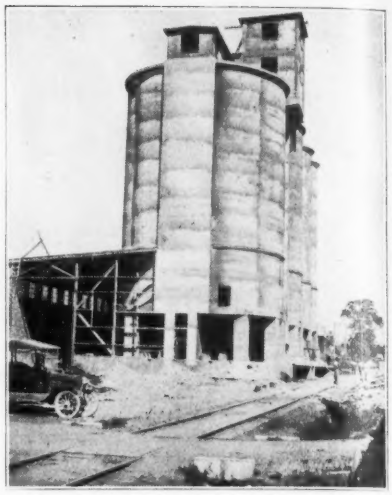
Special Traveling bagger

mixing basin into the storage basin within a period of four to five hours. Its operations are therefore intermittent, and when the compressed air is not used for pumping it may be used in and about the plant for other purposes such as blowing the motors and operating pneumatic air tools.

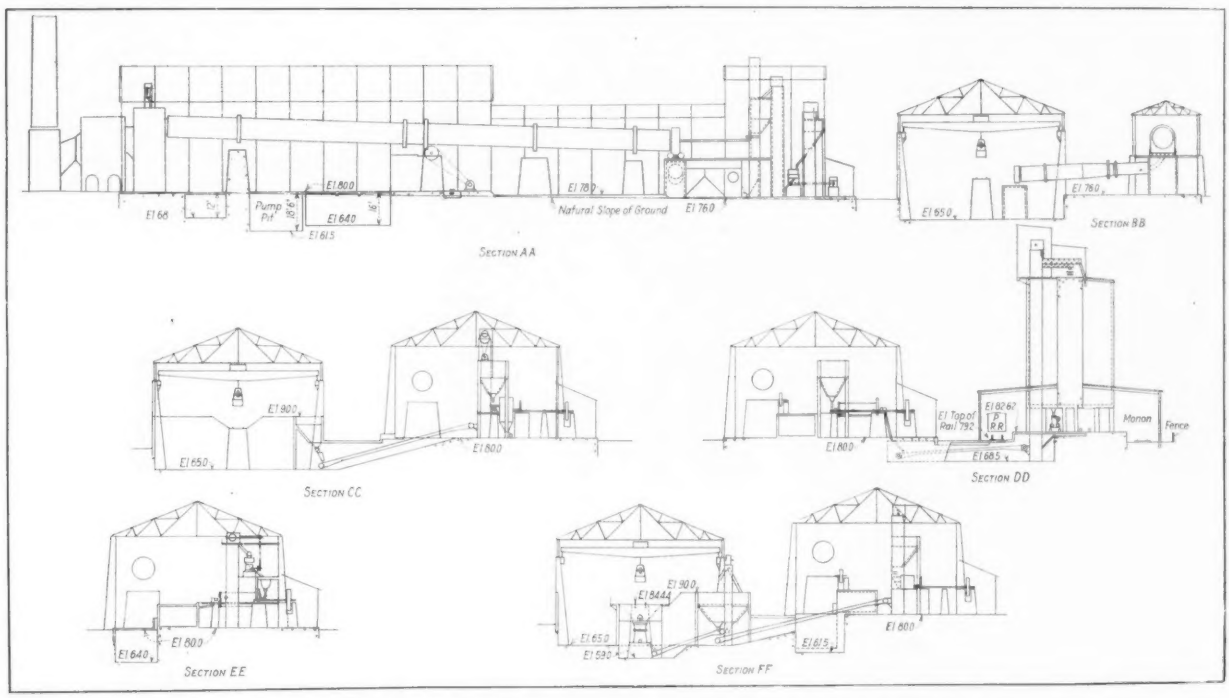
The reciprocating pump for pumping and lifting the slurry from the storage basin to the feeder over the rotary kiln is used on account of its peculiar adaptability for continuous and steady service during the 24-hour period of operation.

Economy of Operation

The features of handling all the raw materials, as well as the clinker and the coal, under one roof by means of a traveling crane is characteristic of this layout. Likewise, the feature of building the stock house silos above the packing floor level so that the packing is done



Cement storage bins—traveling bagging machine on each side next shipping track



Typical sections through plant—showing connections between mill and raw material storage house

weight of 270 bbls. each, or 810 bbls. for the three basins. The mixing basin will hold slurry equivalent to 1200 bbls. of finished cement. The storage basin will hold slurry equivalent to 2,000 bbls. of finished cement. Thus, the combined storage capacity of these basins when filled would be equivalent to over 4,000 bbls.

The air-lift pump used in drawing the slurry from the mixing basin to the storage basin is operated by means of compressed air and is capable of emptying the full amount of slurry contained in the without the usual conveying and elevating machinery and packing house building.

The arrangement of the grinding machinery is laid out so that one miller can take care of the kominuters and tube mills not only for the raw but also for the clinker grinding.

The use of the wet screening device known as the "Trix," located between the kominuter and the tube mill, allows the kominuter to be operated without screens. The trix performs the screening in such a way that the tailings are returned to the kominuter, and the fines to the tube mill. The trix takes up very little space and requires only between 3 and 4 h. p. for its operation.

A very interesting feature of this plant is the universal use of concrete for structural details, which in the average plant would have been made of timber or steel. Another feature entirely new in this country is the traveling bagging machine and the combining of the cement stock house with the packing house. The cement bins are especially designed to load bulk cement.

Gypsum Industry Makes Strides

Much General Building Helps Its Plaster Business—Structural Uses of Material Being Rapidly Developed—Land Plaster Coming Back Strong

FEW INDUSTRIES have profited more by organization than the gypsum industry. For many years the operators of gypsum plants were content to exist on what plaster business they could get without an intensive and constructive publicity and promotional endeavor. Then they passed through various stages of association development until about the first of January, 1918, when H. H. Macdonald became secretary-manager and started promotional work with a punch.

Later on in 1918 Mr. Macdonald was joined in his work by Virgil G. Marani, who had already established a wide reputation as a structural engineer and as a specialist in the new field of structural gypsum. With Mr. Marani's expert knowledge the field for structural gypsum has been greatly expanded and it has received recognition by the American Society for Testing Materials.

This last year, 1919, has seen perhaps the biggest step in advance yet taken by the gypsum producers. After much earnest work and persistent effort the association has developed one of the oldest, but one of the most neglected fields for the promotion of gypsum—the agricultural field. During the past year it has succeeded in obtaining the services of Dr. William Crocker, associate professor of plant physiology at the University of Chicago, to put gypsum on the agricultural map, as Mr. Marani has put it on the structural map.

The possibilities of agricultural gypsum are enormous—second only in prospective tonnage to agricultural lime and limestone. It is nature's source of sulphur as a plant food—and sulphur is a most important constituent of vegetable and forage crops. Its place in agriculture is best given in the statement prepared below, by Dr. Crocker:

Land Plaster Coming Back

"HISTORY REPEATS ITSELF." Perhaps this is more commonly true in agriculture than in any other field of applied science. History seems about to repeat itself in the use of land plaster, at least, recently work makes it clear that we must soon experience a general awakening on the need of sulphur fertilizers, a promising one of which is gypsum, or land plaster. Let us sketch briefly the salient principles and facts involved in the history of the use of this fertilizer.

Land plaster, or agricultural gypsum, is a ground natural rock fertilizer, consisting mainly of hydrated calcium sulphate. It therefore bears two essential plant foods, calcium and sulphur.

In 1768 Reverend A. Meyer of the Canton of Bern, Germany, discovered by accident the fertilizer value of ground gypsum rock. Somewhat earlier, workmen in alabaster at Paris, France, noted that the grasses (clovers) where their clothes were shaken showed a strikingly superior growth. This was rightly attributed to the alabaster, or gypsum, and the fact was put to practical test by a

H. H. Macdonald, Secretary, Gypsum Industries Association

monk. From these two centers the use of this fertilizer spread over Germany and France and later to America, and finally from here to England. Benjamin Franklin was one of the first to introduce it into America. He had a field of red clover that sloped down to one of the main roads out of Philadelphia. On this he sowed ground gypsum in the form of the following words:

"LAND PLASTER USED HERE,
BEN FRANKLIN."

The words soon became conspicuous to passers by, due to the luxuriant growth of clover where the plaster was sown.

The use of land plaster soon became general in the United States and England and it proved strikingly effective on clover, alfalfa, and other crops of the legume, or pea, family; on turnips, cabbage, and other crops of the mustard family; as well as on some other crops. Most of these crops, we now know, use much sulphur and the sulphur supplied by the plaster was no doubt the main source of its effectiveness.

In those days, agricultural experimentation in the United States was done mainly by the big gentlemen farmers, and the big gentlemen farmers of those times included the biggest intellects and the most prominent men of the day. Not a few of these conducted experiments with land plaster.

Judge Peters of Philadelphia, an intimate friend of President Washington, and eight other prominent farmers of Pennsylvania, conducted co-operative experiments with this fertilizer on their respective farms for 25 years. The judge, at the request of President Washington, wrote up these experiments in the form of a little booklet, which he dedicated to the latter.

Peters, as well as John Binns of Loudon County, Virginia, speaks of land plaster raising the fertility of run-down land to a high level. Peters emphasizes its use in combination with green and stable manure. This rise in fertility may be due to the remarkable effect of gypsum on the nitrogen fixing clovers, thus leading to an accumulation of organic matter as well as nitrogen in the soil.

Chancellor Robert Livingston was a great advocate of gypsum for red clover and related crops, and like a number of men of his day, he attributed its beneficial action mainly to the sulphur it contained. These men were probably essentially correct, in their explanation of the mode of action of gypsum, in contrast to many recent authorities on soils who have spoken of gypsum as merely a soil stimulant.

Washington, as the records go, tried land plaster only once at Mt. Vernon and that on oats, a crop not commonly giving any considerable response to it. He, of course, got disappointing results.

In his well-known book on Calcareous Manures, 1832, Edmund Ruffin says:

> All other known manures, whatever may be the nature of their action, require to be applied in quantities very far exceeding any bulk of crop expected from their use. But one bushel of gypsum spread over an acre of land fit for its action, may add more than twenty times its own weight to a single crop of clover.

This is typical of statements that might be taken from agricultural books and farmers' encyclopedias written during the first half of last century.

We ought to comment on Ruffin's fine distinction, "fit for its use," for gypsum sometimes proved valueless even for red clover and alfalfa, the crops it often benefitted so greatly. Like any fertilizer, its addition is without returns if the soil already bears an abundant supply of the plant foods it offers.

In Kent County, England, where it was supposed that plaster would show no beneficial effects due to the high lime content of the soils, Smithe, 1808, reported the following greatly increased yields of leguminous crops due to the application of gypsum:

Sainfoin	45%
Cow-grass	14%
Dutch clover	330%
Red clover	237%

Similarly the value of the seed was increased 300 per cent for Dutch clover and 237 per cent for red clover. Cuthbert Johnson, in his Encyclopedia of Agriculture (1842) reports similar results by various other English investigators.

Now let us shift our sketch over a century of time and to a distant geographic region—Washington and Oregon today. Here they are getting increased tonnage yields of legume crops (clover, alfalfa, and vetch) amounting to 25 to 1000 per cent, and they get these increases not only with gypsum, but with raw sulphur or any other sulphur fertilizer; but they do not get any increases with phosphates or any fertilizer not carrying sulphur. This confirms the claim of some of the investigators of a century ago, that sulphur was the effective agent.

This recent work also reveals another important fact that was, of course, true of the older results, but could not then be learned, a fact only later capable of demonstration, due to the recent development of scientific knowledge and methods—the fertilized legume crops bear a much higher percentage of protein. This means a higher food value of the crop, for protein is the most expensive of animal foods. It also means more nitrogen fixed for the use of later crops in the rotation, and nitrogen is the most expensive of plant foods. Considering both the increased tonnage and the increased percentage of protein produced, the increase in plant and animal foods induced by sulphur fertilizers on legume crops is enormous.

Why did the use of gypsum as a fertilizer decline? This is not unique for gypsum for the same happened with lime. In the old days, marling was very common. This excellent practice largely disappeared, but today it is returning with a rush in the commendable practice of applying agricultural lime. The introduction and advertising of soluble complete commercial fertilizers, beginning with Lewes' invention of acid phosphate in 1842, gradually displaced the old practice of using natural ground rock fertilizers, gypsum as well as marls.

The main factor in delaying a clear explanation of the fertilizer value of gypsum, and in giving general credence to the idea that it acted merely as a soil stimulant was a long-standing misconception of the importance of sulphur in crop growth. This misconception grew out of Wolff's long-used and erroneous method of determining the sulphur content of crops. He ashed the crop and determined the amount of sulphur in the ash. In ashing, all but an insignificant portion of the sulphur was lost. According to Wolff's method, 100 bushels of corn sold from a farm remove 0.2 of a

Virgil G. Marani, Engineer, Gypsum Industries Association

pound of sulphur, while new accurate methods of analysis show that this amount of corn removes 8.5 pounds of sulphur or more than 40 times as much as was estimated on the old basis. A similar relation holds for other crops. The new accurate methods of analysis are rapidly shifting the question of sulphur fertilizers from one not supposed to deserve special attention, to one of the most serious of our fertilizer problems.

The statements and figures that follow show the low supply of sulphur in soils, the very considerable consumption of sulphur by crops, and the much greater loss of it from the soil by leaching.

The average earth's crust contains about 0.11 per cent each of sulphur and phosphorus and the average virgin soils bear about equal amounts of these two elements, but considerably less than the average earth's crust. After soils are put under cultivation, their sulphur content falls much faster than their phosphorus content. The drop in phosphorus can be accounted for almost entirely by the amount removed by the crop; while three to six times as much sulphur is leached out of the soil as is withdrawn by the crop and, in addition, crops remove nearly as much sulphur as phosphorus. In the open country, part of the sulphur lost by leaching, perhaps one-third to one-sixth, is made good by that washed down by the rain. In cities and near manufacturing plants the amount coming down from the air is considerable and may care for crop removal as well as the loss by leaching.

The phosphorus and sulphur removed from the soil by crops may be roughly estimated as follows, considering only the portion of the crop commonly removed from the land in grain farming and figuring on maximum yields.

	Pounds per acre-year removed	
	Sulphur	Phosphorus
Cereal grains (wheat, corn, oats, etc.)	4 to 9	10 to 17
Potato	32.6	17
Alfalfa hay	45.9	36
Timothy hay	15.2	12
Clover hay	13.1	20
Cabbage	40	13

In the average soil there are but few years' supply of either sulphur or phosphorus and both must be added consistently if fertility is to be permanently maintained.

Taking all these facts together it appears that the question of sulphur fertilization is quite as serious as phosphorus fertilization and one fact makes it appear much more so,—the great rate at which sulphur leaches out of the soil.

We are fast reverting to the old practice of using natural rock fertilizers. The use of ground limestone is growing by leaps and bounds and due to the excellent work by Professor Hopkins of Illinois, ground rock phosphate is rapidly spreading as a phosphorus source. Let us assume, as is rightly assumed in the Illinois system of permanent fertility, that nitrogen is supplied by growing clover, or some other legume in the rotation, and that potash is supplied where soils are occasionally deficient in it or when crops with high demand for it are grown. The Illinois system, combined use of ground limestone and ground rock phosphate, lacks one element of permanence and must ultimately fail. It does not supply sulphur and will

finally lead to a deficiency of this element.

A century ago marls and gypsum were the main natural rock fertilizers. No doubt the weakest point in this old system was deficiency of phosphorus. Now rock phosphate supplies this deficiency and a balanced ration of natural rock fertilizers is possible—limestone, gypsum and rock phosphate.

All of these add calcium to the soil and soils high in calcium are generally rich. They neutralize and flocculate the soil and add a balanced ration of the two generally deficient crop foods, sulphur and phosphorus. All favor the growth of legumes, thereby increasing the nitrogen available for crops. By various means they also increase the availability of the generally abundant potash.

The main drawback with rock phosphate is its lack of solubility and availability. This has been largely overcome by big initial additions of finely ground material with green and farm manure. This method of application, along with cultivation, renders it more soluble and distributes it through the soil, allowing good root contact and faster absorption by crops. Two facts make it desirable to apply the gypsum as a top dressing to clover, alfalfa, or other legumes. All past experience shows that these are the crops most benefited by it. Sulphur leaches badly but it will be largely tied up in the form of non-leachable proteins if the gypsum is applied to these great protein makers.

The main advantage of the natural rock system is the fact that more than twice as much sulphur and phosphorus can be purchased per unit cost, than is possible with acid phosphate.

In the old literature the statement is common that additions of gypsum made any likely agricultural land capable of supporting a good growth of red clover or alfalfa. Later it developed that gypsum was not thus effective on all lands. Today it is a common assumption that additions of lime make all lands capable of supporting red clover and alfalfa. Now many exceptions to the rule are appearing. No doubt some lands need lime additions only to become good clover and alfalfa lands; others need gypsum or other sulphur additions only, while still others need additions of both and perhaps other plant foods as well. The needed step is demonstrations to show which is required in each case.

It is to be regretted that we have had few demonstrations during the last 70 years on the effect of gypsum on clover and alfalfa in various parts of the country, and that we have to depend mainly upon the striking results of a century ago and upon the recent remarkable results in Oregon and Washington. These results, however, along with recent work on the sulphur supply of soils and the sulphur requirements of crops, leave little doubt that similar results can be obtained in many places in the United States.

I believe it would mean much to American agriculture if every farmer would do what Franklin did, write his name in his clover or alfalfa field with gypsum. When the use of gypsum at a cost of 50 to 75 cents to the acre, will increase the yields of these crops 25, 100, 500, or even 1,000 per cent, the farmer cannot afford to do without it. The same is true of lime, where an outlay of a few dollars to the acre will do a similar thing. The gain does not end here. More and better legumes mean more proteins for animals and more nitrogen for future crops. These are the most expensive foods, animal and plant respectively.

William Crocker, Agronomist, Gypsum Industries Association

In this article I have discussed mainly the value of agricultural gypsum in supplying sulphur to crops, for I believe this is its greatest virtue. Like all fertilizers, but perhaps to a greater degree than most of them, it acts as a soil stimulant by increasing the availability of other plant foods in the soil; nitrogen, potash and phosphorus. It is an amendment for black alkali. Three-quarters of a century ago, the great chemist, Liebig, pointed out its remarkable power as a preservative of the nitrogen of manure. His claims have recently been largely confirmed.

WILLIAM CROCKER,
Associate Professor of Plant Physiology, University of Chicago.

Advantages of Wheeler Gravel Plant Design

SIR: The writer is interested in the letter published on page 35 of Rock Products, under date of December 20, 1919, and to note the similarity of the sand and gravel plant as operated by the Potts-Moore Gravel Co., of Waco, Tex., to that recently filed and awaiting final approval in the United States patent office. It is indeed a service to be appreciated to have a medium like your journal, whereby the ideas of producers of this vital building material may be brought together from so wide a range of territory.

The production of washed and screened sand and gravel is a comparatively new industry and there are so many different conditions to be found in different deposits that almost every deposit is a problem in itself. For this reason many men have made a failure of the business because they tried to apply methods used in other plants to their own problem and found from experience that they would not work. For this reason the writer believes a frank discussion of the problems involved will be greatly beneficial and avoid many errors.

There are, however, a few points of difference between the plant as it appears in the above mentioned issue of Rock Products and the writer's patent. By the selection of the Gilbert or conical screens it is possible to make as many different sizes of gravel as desired. This can be done on the same plan as that used by the Stephens-Adamson Manufacturing Co., of Aurora, Ill., in the design of its plants. The use of two sand pits instead of one is also a desirable feature as the flow of material through the pits can then be regulated to carry all impurities over the overflow in suspension.

As to the stripping a separate rig for that purpose is desirable, especially in the case of the Potts-Moore Gravel Co., where the depth of sand below water is comparatively shallow, but the writer knows of pits in which it is possible to dredge to a depth of 30 feet and in that case it would require a very heavy overburden to fill the pit enough to cause trouble with the dredge.

DELBERT WHEELER.
Le Mars, Ia., Dec. 24, 1919.

October Cement Exports

WASHINGTON, D. C.—The balance of trade is decidedly in our favor in the foreign export field, according to a report just secured by the Washington Bureau of Rock Products, from the Department of Commerce, our imports during the month of October being only 16,100 lbs., valued at $167, while our exports totaled 281,936 bbls.—$819,894.

This plant ought to produce agricultural lime—from its setting—but instead it produces finishing hydrate and chemical lime

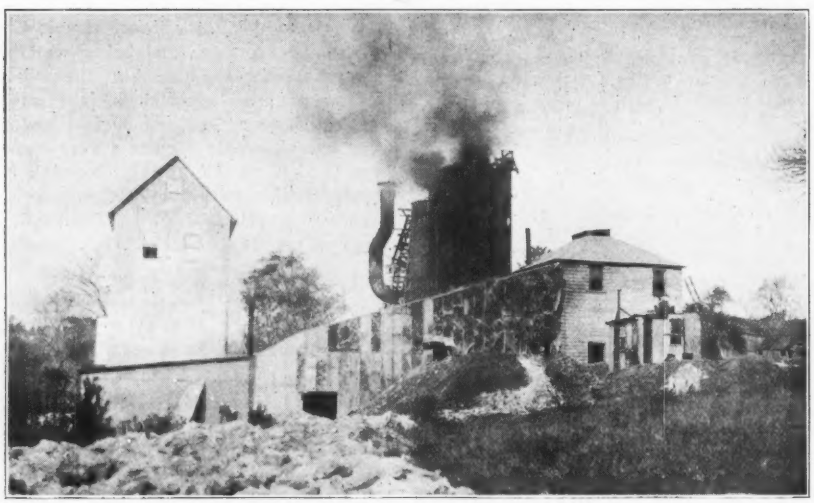
Producer Gas Solves Fuel Problem

Standard Lime Co. Plant, Lee, Mass., Has Interesting Details — Kilns Designed to Burn Wood or Gas

NEW ENGLAND is one of the oldest strongholds of wood-burned lime. A few years ago almost any New England lime manufacturer would have stated unhesitatingly that hardwood fuel produced the best lime. Since then several of these lime men have had a chance to compare the results of hardwood fuel with coal and with producer gas fuel in kilns side by side. They have even tried combinations of wood and coal. Now they are coming to the conclusion that producer gas will give even better results than wood.

Typical Example

A typical case is T. H. Deely, manager of the Standard Lime Co., Lee, Mass., who owns a wood lot in full view of his lime plant, which could supply his fuel needs for years, but who says frankly that his producer gas lime is just as good, if not better, than his wood-burned lime; and he produces a high grade finishing hydrate and chemical lime. He operates wood-fired and gas-fired kilns side by side, but expects to add a mechanical feeder and agitator to his gas producer, which may possibly increase its capacity from six tons per 24 hours to 20 tons, and permit the firing of all three kilns with gas, leaving his wood fuel resources for emergencies.



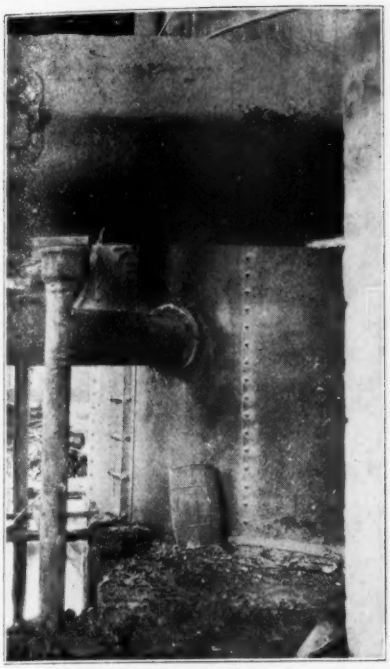
Hydrating plant at left, kilns at right

Mr. Deely has designed his own kilns from long experience and observation. His largest kiln, the one now fired with producer gas, is 12 ft. in diameter and 60 ft. high. It is contracted along one diameter to 9 ft. 6 in. at the fire arch, and to 6 ft. on the other diameter, as shown in the accompanying sketch.

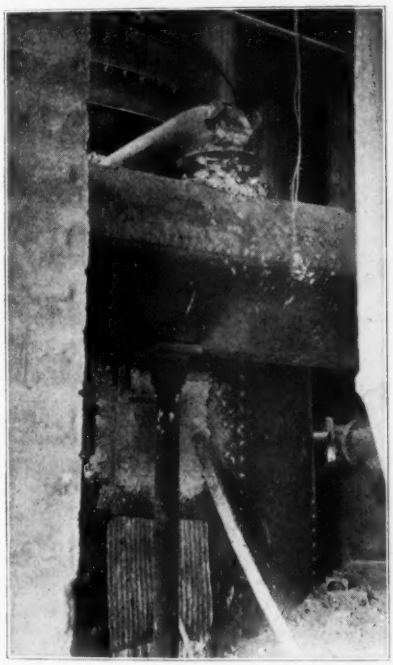
Gas-Firing Methods

More gas inlets are provided than in ordinary practice. Two 12-in. inlets are placed on opposite sides of the kiln on its smallest diameter. Four 10-in. inlets are provided at the ends of longest diameter, as shown in the sketch.

The kiln is unique in that it is designed for either wood or gas burning, without change, or even of a combination of these two fuels, if desired. The fireboxes are left intact, the 12-in. gas inlets being in the tops of the arches, coming down at the fire end so as to throw their flames into the kiln the same as the flames which would come from the wood-burning firebox. The 10-in. inlets on the long diameter of the kiln enter the fire zone on about the



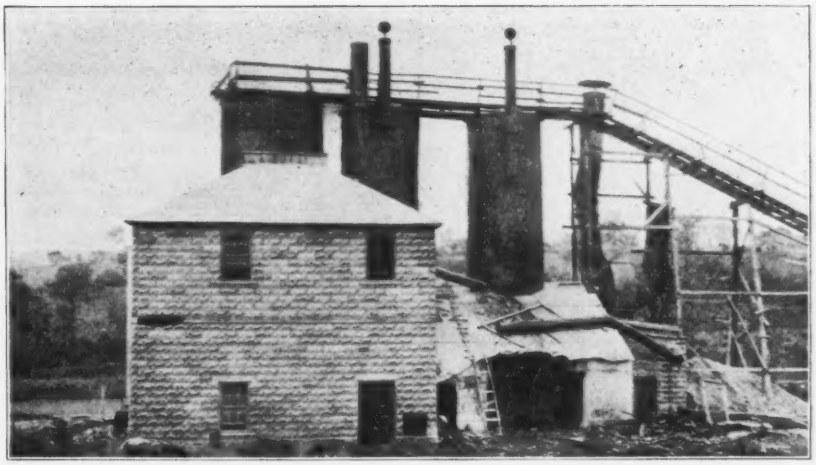
The 10-in. gas inlets (below) and the gas feeder main



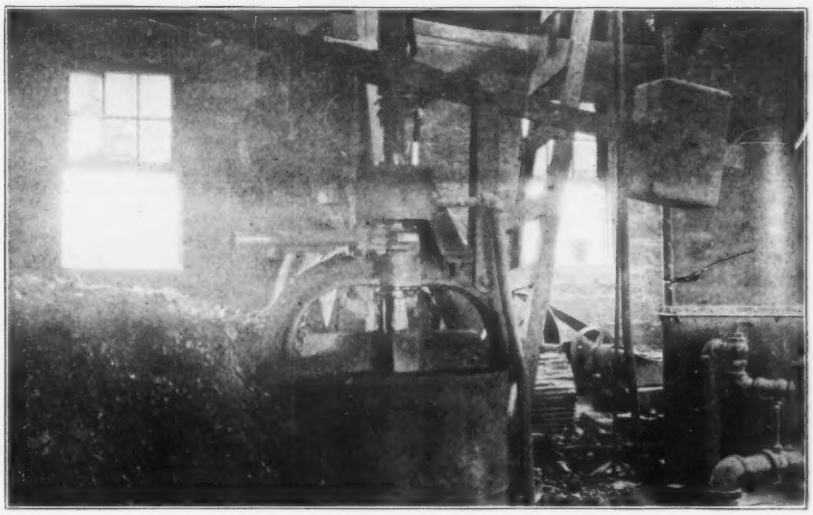
The 12-in. gas inlets over firebox arch

level of the bottoms of the arches of the fireboxes.

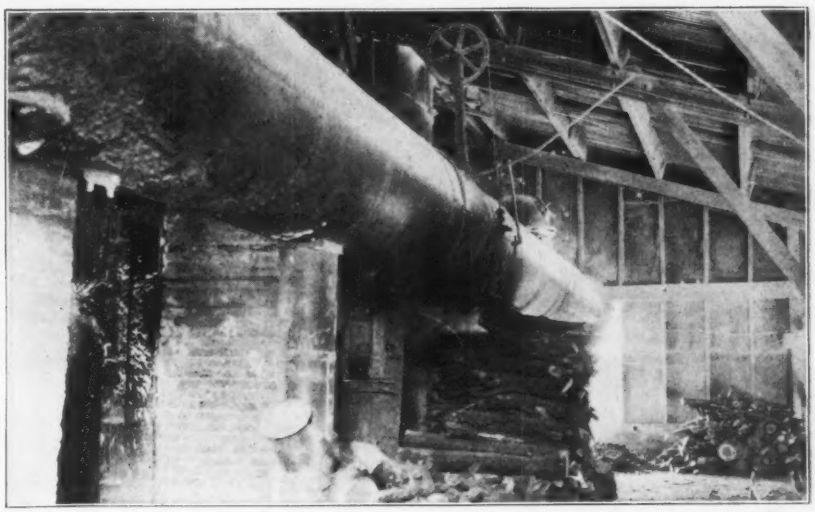
No forced or induced draft is used on these kilns. The producer gas is charged with water vapor before it enters the mains. The air for combustion of the gas from the 12-in. inlets is provided by natural draft through the fireboxes, the same as when wood is burned in them. The air for combus-



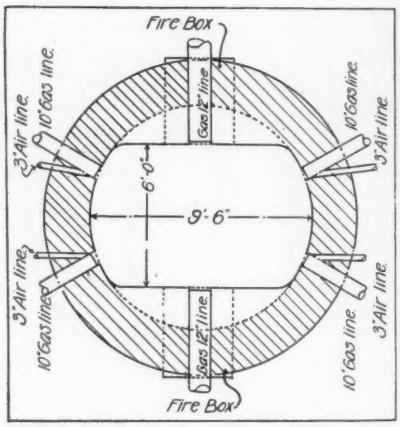
General view of kilns and loading track



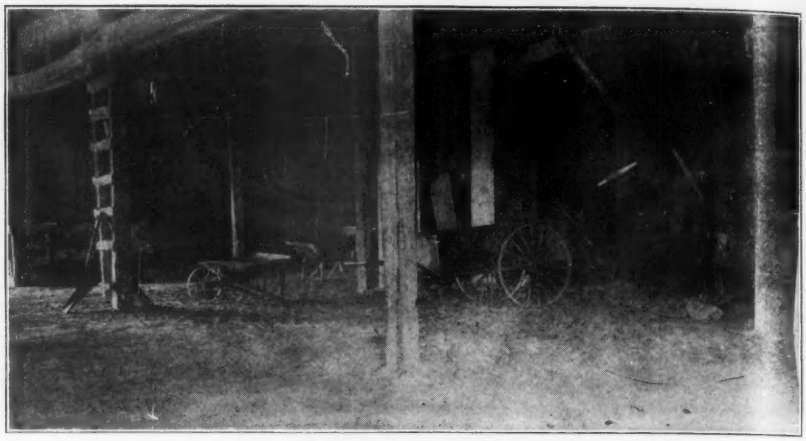
Gas producer in corner of kiln house



Wood-fired kilns equipped for gas burning also



Sketch showing kiln-firing system



Kiln drawing and lime shipping floor

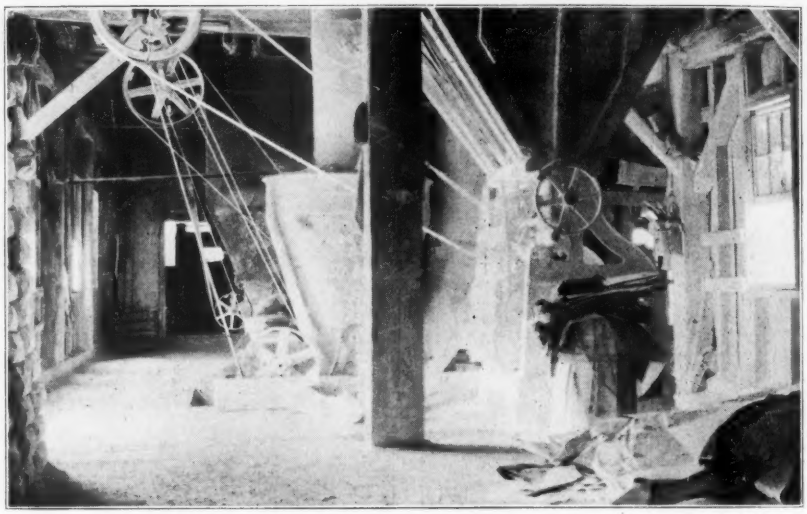
tion of the gas from the 10-in. inlets is provided by 3-in. air intakes, which join the gas mains a few inches inside the fire-brick kiln-lining, giving a Bunsen burner effect, like an ordinary gas stove burner.

This kiln produces about 20 tons of lime per 24 hours. When the gas producer can be operated efficiently by firing one or both the other kilns with it, a fuel ratio of 5 to 1 or better is considered probable. With wood fuel the capacity of the kiln is about cut in half.

Other Kilns and Plant

The other two kilns are of smaller size and capacity, being 10-ft. in diameter by 53-ft. high. They were originally built for producer gas operation, like the large kiln, but until the capacity of the gas producer is increased by a mechanical coal feeder and agitator, or another gas producer added to the plant, these kilns will continue to be fired by wood.

The hydrating plant is in a separate building at a considerably lower elevation than the firing floor of the kilns. The lime as it is drawn from the kilns is fed through a small gyratory pulverizer and is then elevated to bins over the batch hydrating machine illustrated. The hydrated lime then goes through a Raymond mill and air separation apparatus to bins over the packing machine.



Hydrating plant—bagging and shipping floor

Quarry

The quarry is separated from the lime plant by a public highway. The quarry railroad track passes under this highway to the trestle over the kilns. The stone is very white high-magnesium limestone, and produces a high grade of finishing lime, also a caustic lime much used in the New England paper industry.

Both quarry and lime plant labor is on the piece work system. The finished lime is hauled by motor truck to the freight yard at Lee, a distance of about a mile. Even the truck drivers work on the piece work system, being paid for tonnage hauled, the lime company, of course, owning the trucks and keeping them in repair.

Quarry of fine white limestone. Deposit one of the largest in the Berkshire section of Massachusetts

The Standard Lime Co., or Mr. Deely personally, owns many acres of fine quarry property surrounding the quarry opening shown in the view, which is the lowest part of the limestone deposit.

Annual Meeting of the Wisconsin Mineral Aggregate Association

Ends Season of Splendid Progress With Neat Cash Balance and Perfect Harmony

THERE WAS A GOOD DEAL of skepticism a year ago regarding the feasibility of sand and gravel and crushed stone producers working together for a common end. There is no skepticism in Wisconsin *today*, for the accomplishments of the past season are sufficient to put all fears to rest.

At the recent meeting called by the state highway engineer at Madison, to discuss means of expediting road work (see ROCK PRODUCTS, December 20, page 16), a working committee was created to do some of the things suggested. This committee is composed of five highway engineers, five highway contractors, one machinery representative and one material representative—and the material representative is O. C. Hubbard, executive secretary of the Wisconsin Mineral Aggregate Association, notwithstanding the fact that cement and asphalt manufacturers were also represented at the meeting.

The action of the state highway engineer in selecting the secretary of the association as the spokesman of the road material producers of the state is typical of the status the association has won in the official and public mind. At the beginning of the season there was a good deal of suspicion in the minds of many officials, and some newspapers hinted at a "mineral aggregate trust," but as they became better acquainted with the association and its work, this suspicion vanished and the association has been extended the credit it deserves for stabilizing the industry in the interests of public welfare, as well as the producers' own interests.

Portable Plant Problem

A most interesting phase of the reliance of the state highway engineer upon the association's assistance is the proposition put up to its members of building and operating portable or semi-portable plants at such places as are so far from existing commercial plants as to make the use of material from them practically prohibitive. Data was submitted to show that in some instances the cost per ton of commercial crushed stone on some of these jobs would run as high as $5.50.

The State Highway Department promised to take all the preliminary steps, such as the exploration and purchase or condemnation of the deposit, if the association, or individual members of it, would erect and operate the plants. It was stated that the Highway Department was prepared to pay three or four times the prevailing price of aggregates for this temporary plant output when the conditions justified. Contractors have frankly stated that they do not wish to attempt operation of such plants as a side-line, and the state authorities recognize that the organization and experience of commercial operators make them the logical ones to undertake to supply the material. It was estimated five such plants would be needed.

O. C. Hubbard

Executive Secretary of the Wisconsin Mineral Aggregate Association

A committee of the association was appointed to investigate the proposition at the annual meeting of the association in Milwaukee, December 18. General discussion at the meeting showed very little enthusiasm for the scheme, and the general impression seemed to prevail that the state would save money in the end by purchasing all its material from commercial plants. However, it was recognized that the state authorities were exhibiting a confidence in the association which was well worth cultivating.

Officers Elected

The principal other business transacted was the election of officers. All the old officers were re-elected as follows: President, A. J. Blair, vice-president and general manager of the Lakeshore Stone Co., Milwaukee; vice-president, J. C. Buckbee, president of the Northern Gravel Co., Chicago, Ill.; secretary and treasurer, I. M. Clicquennoi, general manager of the Wisconsin Sand & Gravel Co., Milwaukee. The board of directors, or executive committee, was increased in membership to seven, and includes, besides the three executive officers, Ed. E. Gillen, of the Waukesha Lime & Stone Co., Milwaukee; J. K. Jensen, president of the Jamesville Sand & Gravel Co., Jamesville; R. C. Brown, Union Lime Co., Milwaukee, and John D. Ohrt, of the Davis Brothers Stone Co., Lannan.

Urged to Join National Associations

B. H. Atwood of the Interstate Sand & Gravel Co., Chicago, Ill., a director of the National Association of Sand and Gravel Producers, made a strong plea for the national associations in the mineral aggregate field. He said three things the national association could do which the local associations could not, are: (1) Oppose the un-American propaganda now being carried on by radicals and reds; (2) get car service from the railways; (3) fight for reasonable freight rates.

President Blair, who is also president of the National Crushed Stone Association, urged the crushed stone men present to join that association.

Prosperous Association

After having disbursed about $10,000 the Wisconsin Mineral Aggregate Association ended the year with a bank account of about $4,000, which is perhaps the best possible evidence of its prosperity and workability. For its splendid record the first year of its existence, credit was freely given to O. C. Hubbard, executive secretary, whose ready wit, cheerful disposition and unfailing tact have met and overcome every obstacle—and there have been many.

Indiana Crushed Stone Men Hold Annual Meeting

Reorganization Perfected and Annual Dues Placed on a Tonnage Basis

ENTHUSIASM, CO-OPERATION, AND INDUSTRY marked the ninth annual meeting and banquet of the Indiana Crushed Stone Association, held at the Claypool Hotel, Indianapolis, on December 18 and 19. It was considered by all members to be the most satisfactory and successful of any meeting in the history of the organization.

During the last year the Association's membership has grown to include practically all of the Indiana commercial crushed stone producers. This growth has been due in a large measure to the effort and support given to the association and its secretary by the 1919 officers. In appreciation of this hearty support, the retiring officers were unanimously accorded a vote of thanks, and the secretary a substantial bonus in addition.

The first day's session was largely devoted to the making of reports and the appointing of committees. In spite of the fact that in the end the policies of the Association were not greatly altered, there was considerable live discussion and committees worked till well into the night to formulate their reports.

The product of the second day's work was the election of officers, the establishment of assessments on a tonnage basis and the consideration of a method of price reporting similar to that practiced by various other mineral aggregate associations.

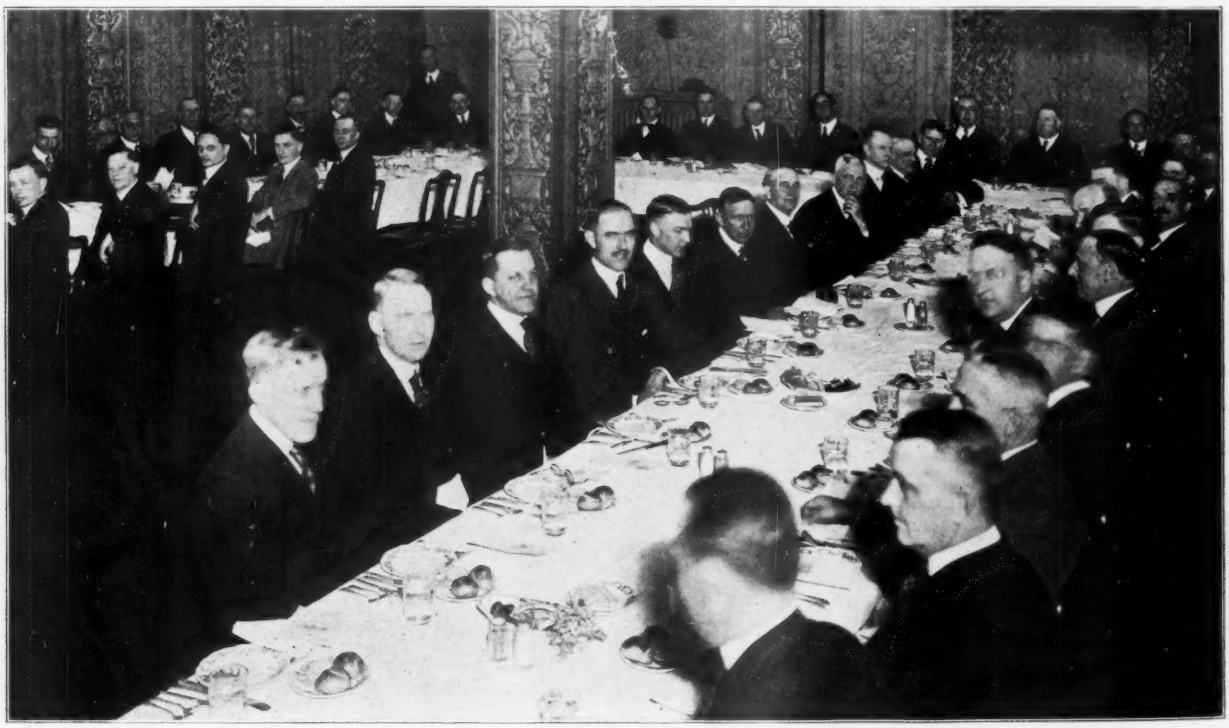
The officers elected for 1920 are as follows: President, George H. Balfe, manager of the Monon Crushed Limestone Co., Monon, Ind.; vice-president, E. T. Milligan, manager of the Muncie Stone & Lime Co., Muncie, Ind.; treasurer, E. B. Taylor, manager, A. & C. Stone & Lime Co., Greencastle, Ind.; secretary, F. W. Connell. Other members of the executive board are, O. H. Binns, manager of the Casparis Stone Co., Kenneth, Ind.; A. B. Meyer, president and general manager of the A. & C. Stone & Lime Co., Indianapolis, Ind.; L. H. Hawblitz, assistant to the vice-president of the France Stone Co., Toledo, Ohio.

During the coming year this executive board will have exclusive control of the direction of the business management and policies of the association.

The new president of the association is a native of LaFayette and a civil engineering graduate of Purdue University. However, he never practiced engineering, but took up work in commercial lines.

He was formerly interested in the manufacture of ice and the retail coal business and served as President of the Indiana Ice Manufacturers' Association, and was District Chairman and Director of the Indiana Retail Coal Dealers' Association during the war period. Mr. Balfe took the initiative of placing the retail coal business of Indiana on a cash basis, which afterwards proved a boon to an almost dejected business. He has always been a good organizer and has the ability of placing matters in the light that invariably induces co-operation, and is a firm believer in "the smaller the business the greater the need for friends."

Last year the association funds were



Indiana Crushed Stone Association banquet, Claypool Hotel

George H. Balfe, President

obtained by a flat charge of $400 per member with the possibility of an additional charge of one cent per ton to meet any deficiency. This year the policy has been altered so that the assessments are entirely upon a tonnage basis—the rate to be fixed by the executive board.

During the coming year money will be spent to develop new uses and to advertise crushed limestone. Special effort will be made to co-operate with the State Highway Department so that the large road building program may be completed with the greatest dispatch.

The subject of weekly price reporting to the association headquarters was considered, but no definite action was taken at this meeting.

E. B. Taylor, Treasurer

Annual Banquet

The two days' session ended with a banquet for which Secretary F. W. Connell should receive much credit, for there was not one moment of lull in the procession of song, music and feasting.

Later in the evening followed a program of after-dinner speeches by men of prominence as highway engineers. Owing to illness in the family, L. H. Wright, director, Indiana State Highway Department, was unable to be present. H. K. Bishop, chief engineer of construction, of the State Highway Department, gave a talk on "Highway Construction" for the state. Mr. Bishop believed in the use of all types of roads—gravel, macadam and concrete. "It is as big a mistake," said Mr. Bishop, "to put in too expensive a road in a place where a less expensive road would answer the purpose, as it is to put a cheap road where the permanent type road is required." Although 1920 may not be a big year in Indiana, owing to sluggishness on the part of the state authorities in supplying funds; in all probability, 1921 will be considerably better.

A. H. Hinkle, chief engineer of maintenance, Indiana State Highway Department, talked on "State Maintenance." Indiana has an appropriation of $1,500,000 for maintenance, but since there is something like 3,200 miles of road to be thus maintained, this sum will not give very much per mile. The maintenance department, which is less than a year old, is planning to keep the present gravel and macadam road system up to a high standard.

G. E. Martin, associate professor of highway engineering, Purdue University, explained the French methods of quarry operation, and the methods of constructing and maintaining waterbound macadam roads in the war zone, as carried out by the American Army highway engineers.

Professor Martin was Lieutenant-Colonel with the 23rd Engineers, which was a highway engineers' regiment.

French quarry operation is conspicuous in that there is a decided lack of machinery and that the limestone is much softer than in America. The French quarryman is a very systematic and slow worker. The product of his hammer is very uniform and is neatly pyramided on the quarry floor. Of an evening the quarry is swept before the workman leaves and all is in good order. Although this practice is very pleasing to the eye and in some instances might be worthy of merit, the necessarily low productivity of the workman would be a shock to the American.

The talks of the evening tended to display and develop a spirit of co-operation between the highway department and the crushed stone men. Although at present each group has problems of its own, the future bids fair to see these problems met on a common basis and worked out co-operatively.

E. T. Milligan, Vice-President

Tennessee Road Building to Start Early This Year

MEMPHIS, TENN.—Contract for 53 miles of concrete and gravel road to cost $400,000, for the northern part of Sunflower County, Tenn., has been let. Twenty miles of the road is to constitute a link in the Sunflower highway from Memphis, Tenn., to Jackson, Miss.

Assembling of gravel and other material will begin early in January. Grading and surfacing begin about March 1.

F. W. Connell, Executive Secretary

Announcing a New Department

REDUCTION of liability insurance rates is certainly a subject of much interest and importance to all operators in the rock products industries. There is but one way in which these insurance rates may be permanently lowered. That is in the improvement of the accident record of the industries.

So, starting with this issue, Rock Products will have regularly a department devoted exclusively to accident-prevention in the rock products industries. This department is conducted in co-operation with the National Safety Council, whose emblem appears in the department heading. A feature of this department will be a question box; any and all readers are invited to submit individual problems in accident prevention to the editor of Rock Products, who has the assurance that the safety engineers of the National Safety Council will answer them whenever possible.

It is realized that accident prevention work in the rock products industries is in its early infancy, and it is hoped, that through these columns, a literature of safety engineering or accident prevention in this hitherto neglected field will be built up, both for the benefit of the readers and of the National Safety Council.—Editor.

Origin and Development of the National Safety Council

By Louis Resnick

LIKE MANY OTHER of the country's greatest institutions, the National Safety Council is the child of necessity. It is an organization that grew out of a great need, felt by the managers of industrial plants who were doing pioneer accident prevention work during 1912 and the half-dozen years immediately preceding it—a need for an exchange of experiences in this work.

No sooner had a few companies demonstrated what remarkable reductions could be made in accidents and what a great economic gain was yielded by accident prevention work, than other companies all over the country became interested and began to burden the pioneers in safety with inquiries for information regarding their experience. So great was the demand for information of this sort that the idea of forming a national clearing house for accident prevention information suggested itself to a group of some two dozen men who were in charge of safety work in as many plants.

The National Council for Industrial Safety was the outgrowth of this idea. It was officially organized at the Second Safety Congress, held in New York City, September 23 to 25, 1913, with the following executive committee: Messrs. R. C. Richards, C. & N. W. Railway Co.; C. L. Close, U. S. Steel Corporation; David Van Schaack, Aetna Life Insurance Co.; Fred C. Schwedtman, Racine-Sattley Co.; L. R. Palmer, Chief Factory Inspector, State of Pennsylvania; H. M. Wilson, U. S. Government Mining Bureau; C. W. Price, Assistant, Wisconsin Industrial Commission; Edwin R. Wright, Chicago; E. G. Trimble, Employers Indemnity Exchange; G. L. Avery, Avery Company; Charles Piez, Link-Belt Co.; A. T. Morey, Commonwealth Steel Co.; R. J. Young, Illinois Steel Co.; R. W. Campbell, Illinois Steel Co.; W. H. Cameron, Chicago.

The purpose of the organization as outlined by R. W. Campbell, the first president, follows:

Outline of Purposes

The National Council for Industrial Safety proposes "to promote the conservation of human life and its incidents in the industries of the nation, and to that end:

(a) To establish a conveniently located headquarters for the maintenance of a clearing house of safety information, available to all concerned.

(b) To encourage and promote throughout the country the organization of those engaged or interested in safety work into district and local councils, in affiliation with this National Council.

(c) To hold annual congresses, at which all persons interested in accident prevention and kindred subjects may take part in practical discussion of vital problems, and also have opportunity to examine carefully prepared exhibits; to publish and give wide distribution to proceedings of such congresses.

(d) To encourage and assist in the practical standardization of safety devices, safe conditions and practices.

(e) To give the widest publicity, through its own publications and other channels, to all matters calculated to promote industrial safety.

(f) In general to initiate, promote, cooperate with and obtain the assistance of, any and all activities or agencies calculated to conserve human life and its incidents in the nation's industries; and to participate in and aid other activities for the welfare of the industrial workers of the country.

The roster of the National Safety Council has grown from a promise of 14 memberships in 1912 to approximately 4,000 industrial concerns operating more than 15,000 plants and employing more than 6,000,000 workers in 1919; and while the scope and service of the Council have gone far beyond the bounds of the original plans, the purposes of the Council as outlined by its first president are substantially the purposes of the Council today, and almost every member of the original executive committee is on the much larger executive committee of today and very active in the affairs of the Council.

Development of Local Councils

In the earliest years of the Council, the need of local activities in organized safety effort in industrial centers began to appear, a need for local organizations which would conduct meetings for workmen, foremen, and executives and accomplish what it was impossible to accomplish through printed matter sent from the national headquarters. The National Council therefore set about organizing locals, of which there are now 35 in operation, and at least a dozen in the process of formation. One of the most important steps in the development of local councils was the adoption of the plan of engaging a full time paid secretary. This was done for the first time by the Pittsburgh Local on January 1, 1917.

Introduction of Safe Practices Pamphlets

In the latter part of 1916, the Council

began to supplement its weekly bulletin service by monthly safe practices pamphlets, in each of which a particular hazard was discussed in detail and the safe practices in the construction and operation of the particular equipment involved were described. This phase of the Council's service has been developed to the point where each safe practices pamphlet represents the result of extensive research work.

Schools for Foremen and Safety Supervisors

The most successful feature of the Local Council work has been the development of schools for safety supervisors, lessons for which are prepared by the Council's Engineering Department. The safety school idea grew out of a need felt by the industries for trained safety inspectors. It is commonly agreed by experts that a trained safety inspector is indispensable to the efficiency of accident prevention work in any plant. Many companies desire to select safety inspectors from among their own employees. The schools conducted by the various locals of the National Safety Council offer an opportunity for the training of such men.

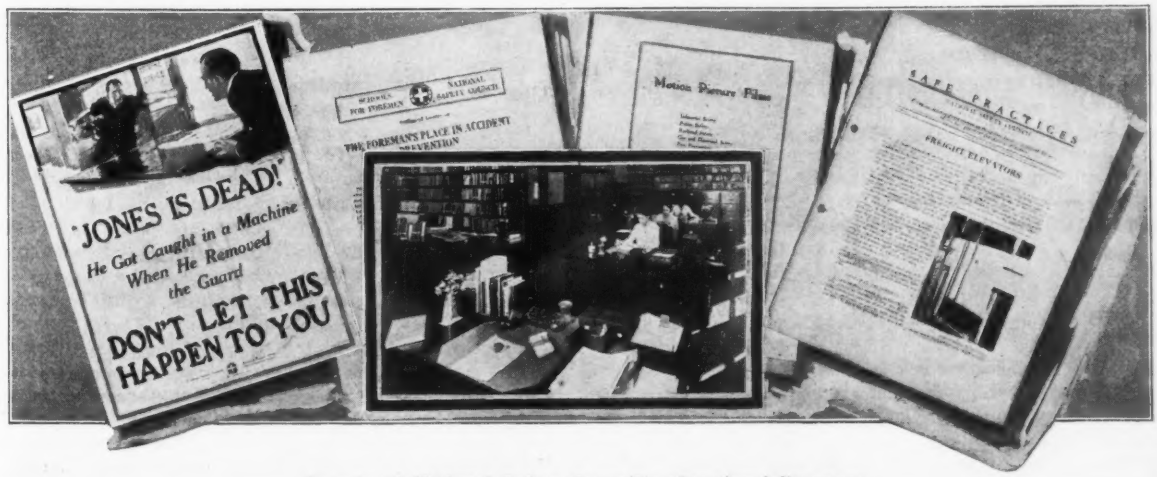
Annual Safety Congresses

The co-operative spirit that has made the National Safety Council possible is perhaps best demonstrated at the annual Safety Congresses, where some three or four thousand men and women meet to hear formal papers prepared by 150 or more speakers and to participate in round-table discussions on every phase of safety that is of interest to large groups. The Council conducts such a congress in a different industrial center each year. With the congress at St. Louis in 1918, the Council began the practice of conducting with the aid of its local Council, a safety week co-incidental with the annual congress.

Library and Educational Facilities

From the very inception of the Council, the headquarters office began to develop a library. What began merely as a file of the information that was sent in by members has developed into the most complete library on accident prevention and industrial relations in the country. The N. S. C. library has 10,000 booklets and pamphlets, 500 books, 5,000 clippings of special articles, and 1,500 blue prints and photographs, all devoted to safety or other industrial relations subjects. The library files contain practically all of the Council's correspondence that is of informative value, tabulated questionaires on a great variety of subjects and a mass of other sources of information. Practically everything that has been issued on the subject of safety by the United States Government and the various state governments is to be found on the shelves of the Council's library and is to be had for the asking by any member.

The Council has not limited its educational work to its own membership. In some forty or fifty universities, through the efforts of the National Safety Council, the faculties have been induced to incorporate safety instruction into the curriculum. These universities are now giving consideration to the requirement of safety, both in instruction involving machie designing and plant management. Safety will be taken up in public schools.



Sample of National Safety Council's educational literature

Aggregate Shortage in New York

Shortage of Material Retards New York Building More Than High Prices

DEFINITE gage of the probable scope of the 1920 building market was obtained toward the week-end by the demand upon dealers for building materials, the announcement of the contract price for sand, gravel, crushed stone and grit that will rule in this market between now and June 30, and the provisions that are being made to arrange for a free supply of building material into this market to last during the next 12 months, says the Dow Service Daily Building Report.

Concrete Aggregates as Barometers

The best barometer as showing that the building movement for next spring is going to be above the best normal ever known is that of concrete ingredients, such as sand, gravel, crushed stone and grit. The contract price as issued to the trade, shows clean Cow Bay sand at $1.90 a cubic yard, as against a price of 45 cents in 1912; $3.25 a yard for crushed stone, as against 85 cents in 1912; $3.25 a cubic yard for gravel, as against 85 cents in 1912, and $3.50 a yard for grit, as against 50 cents in 1912. The fact that as soon as these prices had been issued to the trade, important tonnages for future delivery were booked, signifies that the market is much stronger than price.

Financial, constructional and building material interests who have been watching with growing interest the rapid advance in the price of building materials and construction costs, expressed considerable satisfaction in the passage of the Edge-Ackerman amendment to the Federal Reserve Banking Act in that it will encourage the erection of much-needed office and loft buildings downtown for the newly formed corporations.

Large Contracts Show Genuine Demand

Whatever the cause there was a distinct change toward greater activity in the general construction market last week. Vast projects running into the millions came into the active estimating market, with some contract awards. The closing of navigation to the shipment of brick to this market before Christmas, for the first time in 30 years, proved the genuineness of the demand for materials when it was made attractive to dealers to arrange to have necessary brick rushed to this city by rail during any possible ice embargo. This is a recourse probably never before resorted to.

Year-end price movements in the building material markets of the entire country, with the exception of the extreme southwest and north Pacific points, register the pressure of excessive demand against diminishing supply.

It has remained to be actually proved that high prices do not stifle construction of buildings. The year 1919 began with what were considered prohibition war-time price levels. It ends with the levels of last January wholly eclipsed and made as diminutive as the levels of 1912 seemed to those created by war conditions. The year began with the Federal Government officially urging upon the people of the United States to proceed with their building plans. It ends with the people of the country ready and anxious to build homes, factories, office buildings, hotels, theaters, lofts and docks and terminals, but absolutely unable to obtain materials in the quantity desired, although prices asked are higher than the building industry has ever known them to be.

The people have the money to pay for the materials needed, even at premium bases, but the Federal policy that placed restrictions upon the free production of building materials during war time and classed them as non-essential is now having its deleterious effects, not only upon the thrifty citizen, but upon the merchant, the manufacturer, the railroad and the government itself.

Effect of Building Material Shortage

There is such a shortage of building materials today that the Federal government ascribes the inactivity of the Treasury Department's scheduled peace-time building program to a desire not to further drain the present supply of materials and the public building work has therefore been indefinitely deferred except in urgent cases. The railroads are to be turned over to their owners in March, and there is much structural material to be called for to put them back into shape, say railroad authorities.

Estimates made for 160 cities on December 20, indicated a total pledged for building construction work of $1,315,000,000. The best year the country ever knew in value of new building projected was 1916, when it reached a grand total of $1,469,000,000, with 200 cities reporting. New York probably will close the year with more than $300,000,000 pledged to building work. In 1916 New York recorded $221,000.000 worth of building construction; in 1917, $103,000,000, and in 1918, $56,000,000.

Such a building movement never was expected or conceived. The volume of construction work in 1920, even at this early date, is limited only by the ability of building material plants to produce and ship. The potential demand is already expressed in contracts signed and sealed sufficient to take almost the capacity of plants producing all but two of the basic commodities east of the Ohio river, up to April 1, 1920. The structural steel shops have only 31 per cent of their capacity left.

Expect Higher Priced Cement

The advance in the price of Portland cement, which was predicted in the Dow Service Daily Building Reports as something to be expected around the first of the year, developed in part by two companies advancing the wholesale price 25 cents a barrel. The larger companies have not yet followed suit, although there is a general proposal being advanced to increase the credit on the empty cotton bags from 15 cents to 25 cents. This proposal has aroused a general protest on the part of the dealers, who take the stand that the boost in the price of bags to the manufacturer should be added to the cost of the material rather than to making a further change in the price of the bag which, they say, is an unwise thing to do at a time like this. The manufacturers say that bags that formerly cost them $112 a thousand now cost $280, and that they have been absorbing these extra costs all during the war and since its close. It is further shown that Portland cement has stood out almost alone during the war and since its close, with the distinction of not having shown an advance in price, but during the war actually voluntarily made a cut below that recommended by the Federal authorities.

The situation in the Portland cement department is extremely acute. Some mills have had to scrape their bins to maintain shipments in the face of the recent recessive demand, which is still growing. There are more than 30 000,000 yards of roadwork already under contract and it takes three-fourths of a barrel of cement to a yard of concrete road. Even at this date the stocks of cement in the two zones supplying this market are lower than they have been in six years with one exception, and in that case the difference was only 100,000 barrels, in 1916. The present demand is 90 per cent greater than it was at this time last year.

General News from Rock Products Markets

Sequel to an Interesting Sand and Gravel Lawsuit

LOUISVILLE, Ky.—On December 19 the Kentucky Court of Appeals rendered a decision, by Judge Flem D. Sampson, which has proven one of the most interesting in years. This was in the now famous case of the Paul Barth heirs against the Fidelity and Columbia Trust Co., to recover stock in the Ohio River Sand Co., which was sold to Charles Bohmer and John Settle, stockholders of that company, twenty-eight days after the death of Paul Barth, their former business partner, for $27,500.

The sale was not made according to the Kentucky statutes, Section 4707, under which such a sale must be made by court. It was a private sale, in which the appraisers purchased at their own valuation.

This case was in the courts for twelve years and more, and finally the Barth heirs, who are now grown boys or men, again secured possession of the stock. The Barths will pay $27,500 plus interest for the sand company stock, and the $6,600 received for 60 shares in the Island Land Co., which owned the site from which the sand was dug and barged to Louisville. The island company was merged with the sand company some years ago. The Barth heirs will pay back $34,100 credited to the estate, and interest covering the period of twelve years, while Messrs. Bohmer and Settle will have to account for dividends on the stock of about $13,000 to $15,000 per year and interest over a period of twelve years. It is estimated that the Barth heirs will get back about $156,000 in cash, besides the stock. The case may still be appealed.

World Resources of Talc and Soapstone

TALC AND SOAPSTONE, together with pyrophyllite (usually sold as talc) are very widely distributed over the earth. Deposits are known in nearly every country but the production on a commercial scale has largely been confined to the countries of highest industrial development. Thus the United States produces about 65 per cent, France 13.4 per cent, Italy 7.4 per cent, Germany and Austria, 5.4 per cent, and Canada 4.7 per cent. Soapstone, used in slabs and fabricated articles, such as sinks and tubs, is produced in important quantities only in this country. It should be noted, however, that the aborigines in this country and the natives of many other countries, such as India, and Brazil, made use of, and still make use of massive soapstone in the manufacture of pots and kettles.

While the most valuable grade of ground talc is that used for toilet purposes, by far the largest production is of the lower grades, used in the manufacture of paper, rubber, paint, prepared roofing, and other industrial uses. Since the lower grades of talc will not stand high transportation charges, it follows that the greatest production will come from the countries and districts which have best developed the industrial uses. In the United States, Germany and Austria, many uses have been found for the lower grades of talc. In France and Italy the principal product shipped is high grade talc for toilet purposes and massive talc for the manufacture of lava, but some use is made of the lower grades. In most of the other producing countries there is little or no market for anything but the highest grades. Thus India, Brazil, Japan and Spain, with many known deposits, produce only small quantities.—Raymond B. Ladoo in "Monthly Reports of Investigations," U. S. Bureau of Mines.

Bear These Dates in Mind!

FEBRUARY 9, 10 and 11, the National Crushed Stone Association meets at the Seelbach Hotel, Louisville, Ky.

FEBRUARY 11 and 12, the National Association of Sand and Gravel Producers meets at the Sherman Hotel, Chicago, Ill.

THESE mineral aggregate industries face the biggest year yet, but they also face the biggest problems ever met with. Don't try to meet these problems singlehanded. Join the crowd with the "big stick."

Beaver Portland Cement Company to Resume Production

THE BEAVER Portland Cement Co. factory, erected at Gold Hill, Oregon, in 1914, at a cost of $650,000 and operated a short time in 1916, is being rapidly refitted by a large crew of workmen and will be ready to operate about the first of the year.

Finances and rivalry of share and bondholders have caused the idleness of this large structure during the past year, while large quantities of cement have been used in Jackson and Josephine counties in building highways and bridges. In the recent refinancing of the organization in Portland, under the management of Fletcher Linn, the Portland, Willamette valley, and local share and bondholders took over all the holdings of the eastern and middle western investors. In lieu of these holdings preferred stock has been issued.

The capacity of the plant is 1,000 barrels or 4,000 sacks daily, requiring 50 men to operate and 40 men for the two quarries supplying the plant. The plant is located on the main line of the Southern Pacific railway. One of the quarries is three miles below the plant, on the railroad, while the other quarry adjoins the plant, supplying the limestone, shale and clay for the finished product. The lower quarry supplies the plant with crushed limestone and commercial limestone. The plant and quarries are operated by electric power, and crude oil is used for fuel in the burners.

Sand Dredging Companies End Successful Season

LOUISVILLE, Ky.—Cold weather has caused the four or five large sand companies which dredge sand from the Ohio River, to remove all of their equipment to the canal, or in the shelter of islands, where it will be safe from ice during the winter. During cold weather it is impossible to barge sand, as it freezes in the barges, and becomes impossible to handle, while there is much damage done to a barge that is frozen up. Again if ice catches the digging equipment, heavy losses are sustained.

The Louisville sand companies had a good season on the river, and their yards are well filled. There will be no need for digging before March unless an unusually heavy demand breaks in the early spring.

Cold weather during the past ten days resulted in a rapid rise in the Ohio River being checked. This rise would have given some of the sand and wall plaster companies on the river front considerable trouble, as it was at the danger stage when it started to subside. One of the largest wall plaster companies is located in the sand yard district, where it can secure its sand without long hauls.

Dry Fall Lengthens California Road Building Season

IN CENTRAL California a very dry fall has given street work contractors a chance to clean up practically all their work. It has been a slow season's work, with the shortage of labor and materials.

Review of Crushed Stone Prices in 1919

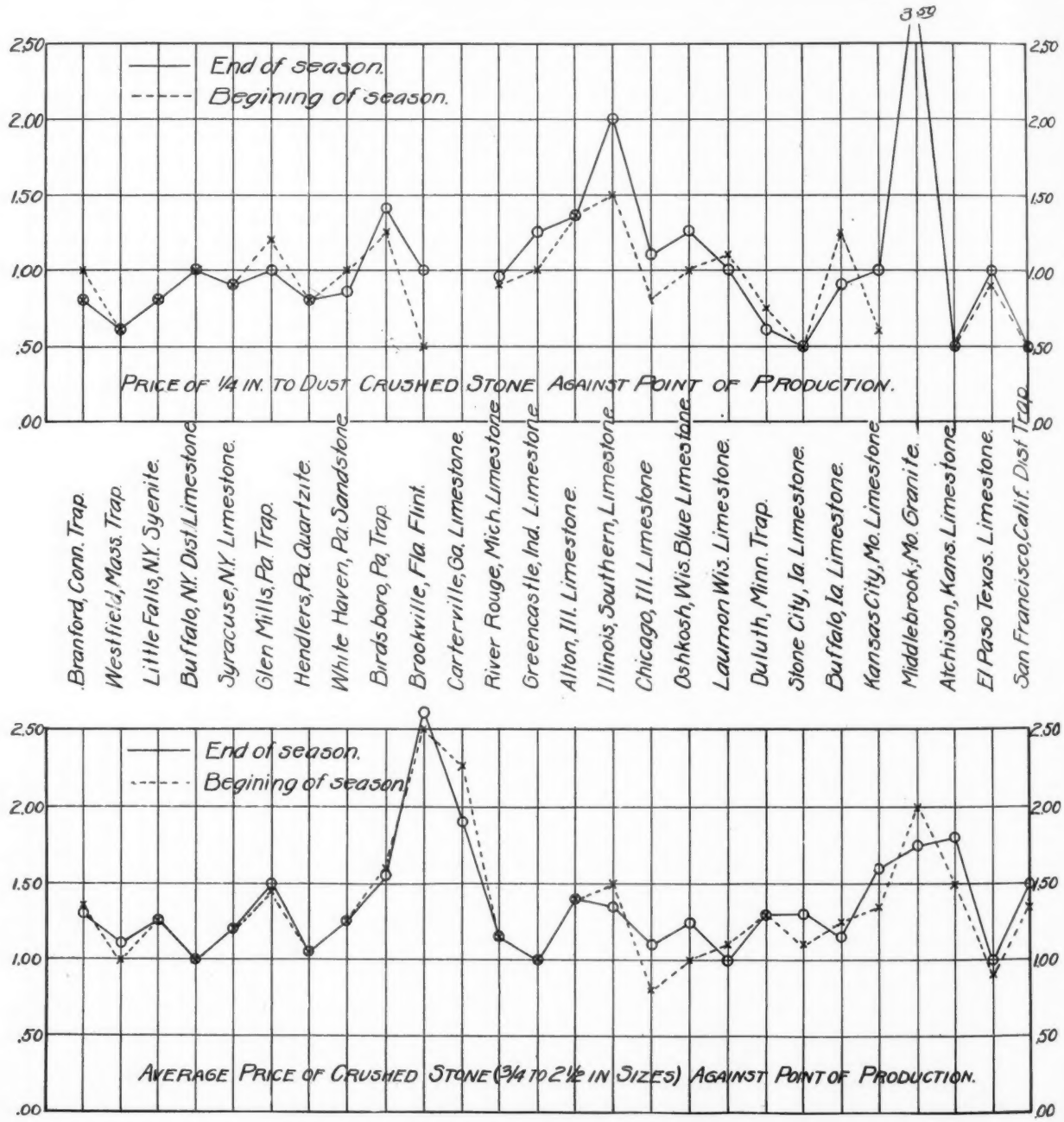
THE AVERAGE PRICE of crushed stone screenings in 1919 was about $1 per ton, f. o. b. plant. The average price of commercial crushed stone was about $1.25 per ton, f. o. b. plant.

The diagrams below show the price fluctuations according to geographical location—from east to west, across the continent—at 26 typical shipping points, at the beginning (March 1) and the end (November 1) of the active season.

It will be noted that the peaks in the diagram occur where some special use is made of the material—Pennsylvania trap rock screenings, used for top dressing bituminous pavements; southern Illinois limestone screenings, largely sold in the spring as agricultural limestone; the Missouri granite screenings, which have special markets for roofing, floors, etc. In commercial crushed stone prices the peaks occur in communities where the demand and production are relatively small and of no important influence.

The diagrams show that the prices of commercial crushed stone remained fairly constant during the season, and that through the Central West there was some tendency for prices to recede.

In a considerable number of instances, notably in the East, the prices established in January held throughout the year without change.



Price range of crushed stone at various shipping points in 1919

Review of Sand and Gravel Prices in 1919

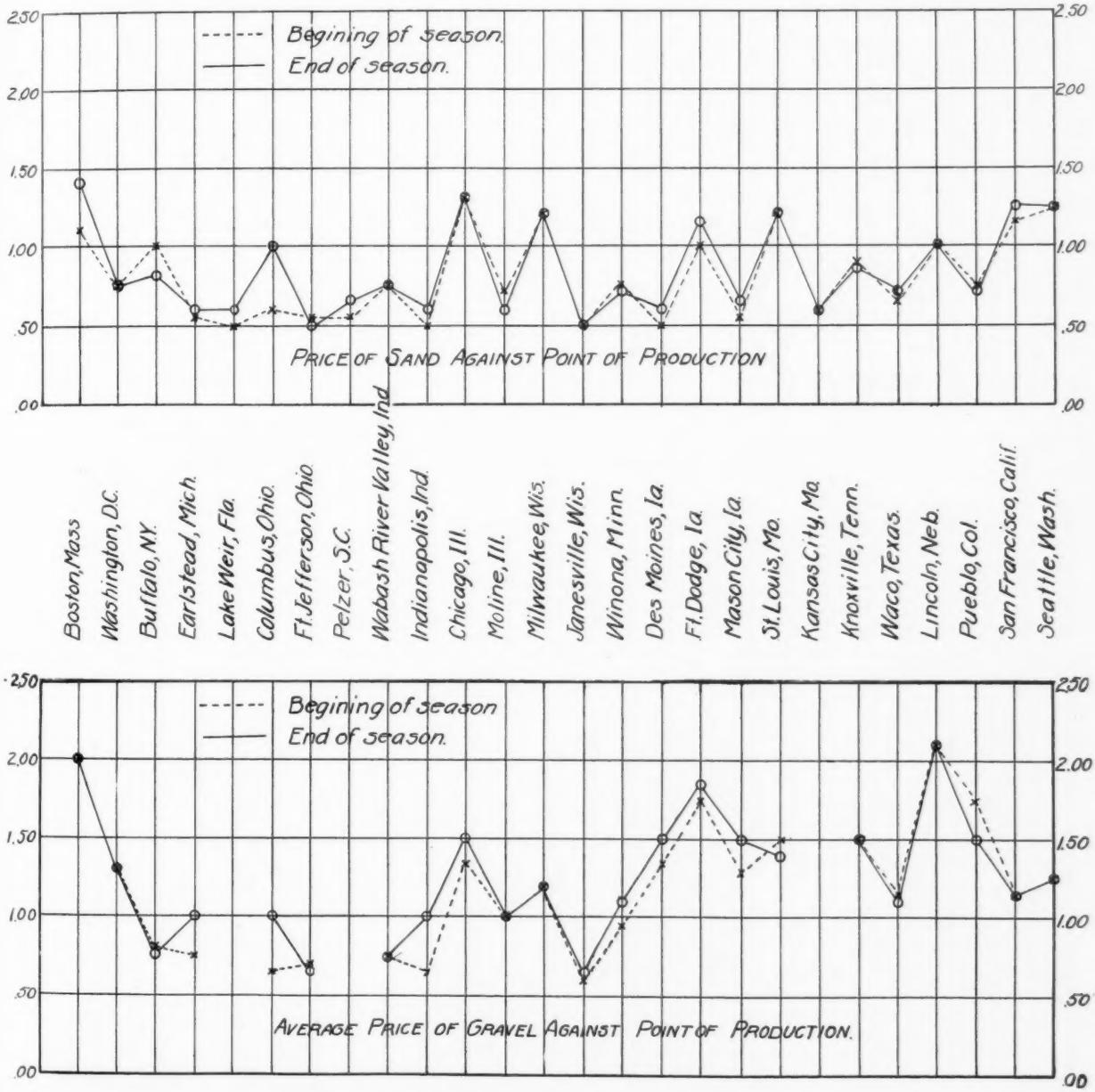
THE AVERAGE PRICE of washed and screened sand in 1919 was somewhere around 75 cents per ton f. o. b. plant. The average price of washed and screened gravel was somewhere near $1.15 per ton.

In both instances the averages and the fluctuation of prices, according to geographical locations, as illustrated below, is somewhat complicated by the fact that the prices at Boston, Washington, Buffalo, St. Louis and other cities are the f. o. b. **wharf** prices, rather than plant prices. In the case of Boston, for instance, the price includes a 40-mile or less water transportation charge.

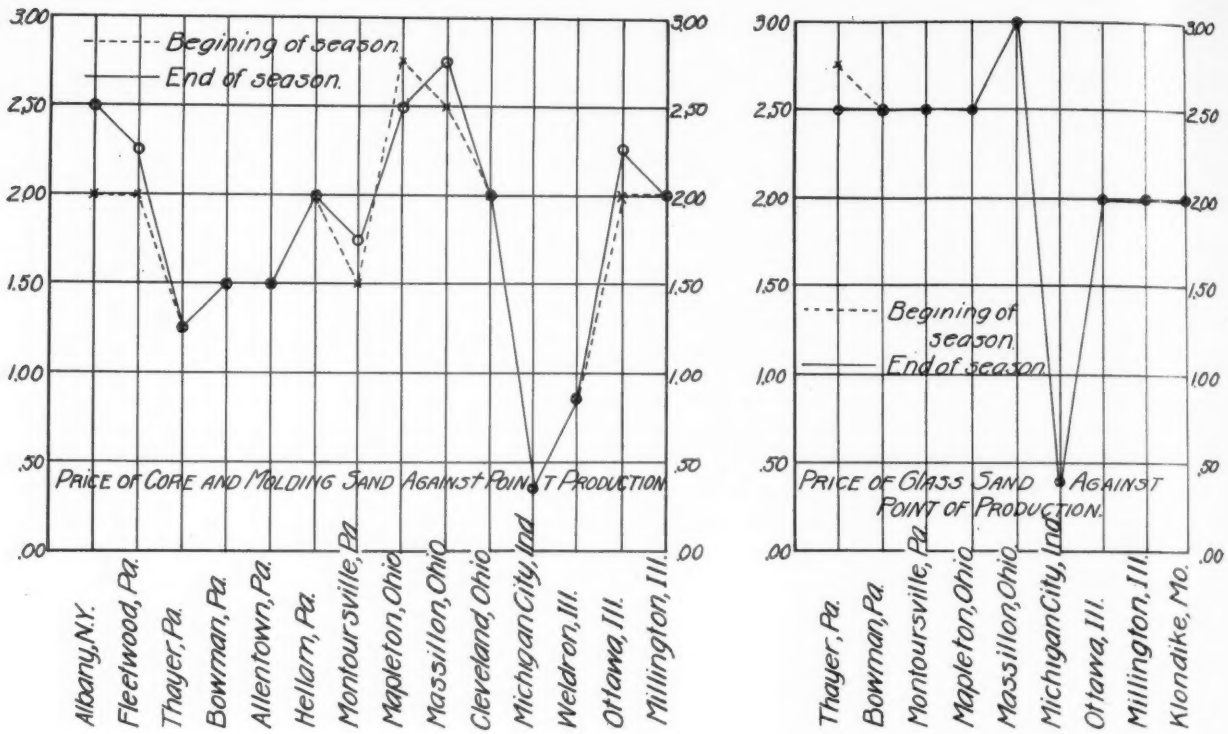
Most of the peaks in the diagram are accounted for in this manner. The other high points are f. o. b. prices in large cities, where some transportation cost is obviously included, exceptions being Indianapolis, Columbus and a few other cities where the plants are actually in the city.

Gravel prices show the greatest variation of any of the rock product materials. This is doubtless due to the fact that the term gravel as used here and as used in commerce, is a very elastic term and covers a multitude of products. In nearly every case, where the market exists, operators get from 50 cents to $1 per ton more for ¾ and ½-in. gravel for roofing than for the larger sizes.

The best prices for gravel are in the Far West, where there is little competition with commercial crushed stone.



Price range of sand and gravel at various shipping points in 1919



Price range in various kinds of silica sand at typical shipping points in 1919

Agricultural Limestone Prices During 1919

THE AVERAGE PRICE of agricultural limestone in 1919 was about $2 per ton, f. o. b. plant. The geographical variation in prices shown in the accompanying diagram shows a steady retrogression from east to west, which is largely accounted for by the fact that finely pulverized material is used in the East, while stone screenings are largely used in the Central West.

There are, of course, a considerable number of plants in the Middle West producing fine ground material, but these are handicapped by competition with screenings. West of Ohio the price of screenings sold for this purpose is undoubtedly the largest factor affecting the price of agricultural limestone.

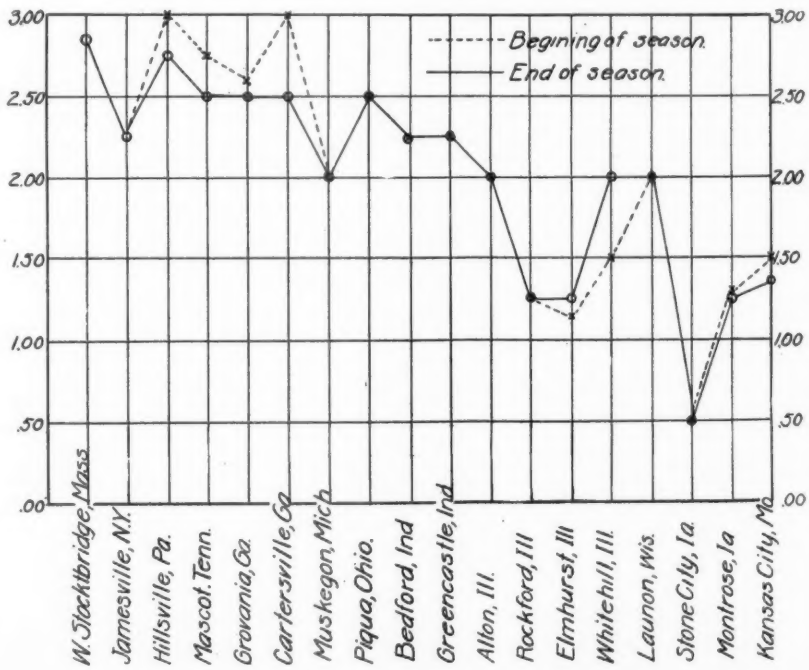
This is also a factor of extreme interest to lime manufacturers who are desirous of developing an agricultural lime demand in these states.

In general the demand for agricultural limestone in 1919 exceeded by far the demands of any previous year, but shipping and labor conditions probably prevented a record in maximum production.

Every indication points to the greatest growth in this field of any of the branches of the rock products industries. The big problem facing the industry is a relative adjustment of fineness of grinding, quality and price.

Silica Sand Prices

AVERAGE PRICES of silica sand for glass manufacture and of foundry sand mean little or nothing because the character of the material is paramount. Users of these sands usually stick to the kind that suits them and pay a fair price for it. The diagrams are chiefly interesting in showing the price limits.



Price range in agricultural limestone at various shipping points in 1919

Seasonal Variation in Price of Crushed Stone and Screenings

THE DIAGRAM below shows the average price, per ton, f. o. b. plant, of crushed stone and screenings of 20 typical plants, whose complete seasonal records were available.

This graph illustrates a very interesting fact. There was, taking the country as a whole, an actual slump in prices established at the beginning of the season. This is in part accounted for by the fact that the January prices are for winter delivery and should always show 5 to 10 cents more per ton. These statistics, however, include Southern plants where weather conditions were not factors in the prices then quoted.

Seasonal Variation in Price of Sand and Gravel

THE DIAGRAM below shows the variation in the average price per ton of sand and gravel as quoted at 20 typical plants throughout the country during the operating of 1919.

It will be noted that from May on there was a fairly uniform rise of a few cents per ton in both sand and gravel. This reflects the increasing demand as the season advanced for these materials as used in general construction.

Unlike crushed stone, a fairly large proportion of sand and gravel is sold in small job lots and under conditions which give a little more elasticity as regards price. In general the sand and gravel producers appear to have advanced their prices to keep pace with operating costs.

As shown by the two graphs, side by side, the average price of gravel was about 10 cents less per ton throughout the season than that of crushed stone.

Neither the crushed stone nor the sand and gravel prices show much of any effect from ballast prices, as this business was pretty much at a standstill, and where sales were made the prices are not included in these averages.

The graph for the price of sand shows a striking similarity to the graph for the price of stone screenings. There is not sufficient evidence in hand to show that stone screenings are being used to a sufficient extent in place of sand to exert any effect on the price of sand, but the possibility is there. It would seem a reasonable conclusion that the early rise in the price of gravel as against a drop in the price of sand shows an early scarcity of coarse aggregate and a rise in gravel prices approximating the difference in current prices of crushed stone and gravel for the same purpose.

Seasonal Variation in the Price of Agricultural Limestone

THE DIAGRAM below shows the seasonal variation in the average price of agricultural limestone at about 20 typical producing centers.

This graph follows in a general way the graph for stone screenings, which shows the influence agricultural limestone screenings have on the average stone screenings price.

The drop in the price of agricultural limestone as the season advanced is evidence of pretty keen competition, in the face of operating conditions that existed last year at this time. Evidently also, it is a demonstration of the old fallacy that has more than once been the undoing of the stone men—the lowering of prices to get tonnage in the hope of profiting on maximum production rather than taking the profit as they go along.

Prices declined until the end of the spring rush of business, and then producers evidently began taking account of stock and profits and prices began to rise again to cover the increased costs of production. Nevertheless the closing price was less than the opening price for the season.

Graphs of average prices at various seasons of the year of crushed stone, sand, gravel and agricultural limestone based on records of about 20 typical plants

Another interesting fact is that the price remained practically constant from March on to the end of the season in spite of the fact that operating conditions went from bad to worse, and costs mounted accordingly. Crushed stone is obviously not an elastic commodity, being sold largely on quotations made early in the season for delivery at the convenience of the contractor. Consequently it behooves producers to establish a price at the start sufficient to allow for such contingencies as those of the past season.

The high point in the screenings graph is accounted for by the large demand for limestone screenings at that season for agricultural purposes.

There is much evidence that screenings of all kinds of stone are finding constantly a wider and wider market, and doubtless the time is approaching when they will command as high or a higher price than the coarser product, which would be entirely justifiable as they are the product of a crushing plant which costs the most power to produce.

Reduced Freight Rates on Road Materials Remain

UNDER date of December 29, the Director General of Railroads has issued a circular letter to all carriers authorizing the extension of the special freight rate on all crushed stone, sand, gravel, slag, etc., used in public works until February 29, or the end of the Federal control period.

The order was originally issued for the year ending December 31 only. The extension of time granted may be taken as a favorable sign that the authorities consider present rates enough.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton. F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Auburn and Syracuse, N. Y.	.80	1.20	1.20	1.20	1.20	1.20
Buffalo, N. Y.	From stock, 1.50 per net ton, all sizes					
Burlington, Vt.	.75@1.00	2.50	2.50	2.00	2.00	.....
Chaumont, N. Y.	.....	1.75	1.65	1.35	1.25	1.25
Coldwater, N. Y.	Flux, 1.50@2.10					
Limekiln, Md.	1.25	2.10	2.00	1.75	1.40	1.25
North Leroy and Akron, N. Y.	1.00	1.00	1.00	1.00	1.00	1.00‖
Pittsburgh, Pa.	1.25	1.40	1.50	1.50	1.50	1.50
Redington, Pa.	1.00	1.10	1.10	1.10	1.10	1.10‖
Walford, Pa.	1.50	1.60	1.60	1.60	1.60	1.60
CENTRAL:						
Alden, Ia.	.50	1.00	1.00	1.00	1.00	.....
Alton, Ill.	1.75@2.00	1.30	1.30	1.30	1.30	1.30
Bettendorf, Ia.	1.50 per cu. yd., all sizes					
Brillion and Sherwood, Wis.	.90@1.00	.....	1.00	1.00	.....	1.00
Buffalo, Ia.	.90	1.30	1.20	1.10	1.10	.....
Chicago, Ill.	1.00@1.20	1.20@1.50	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Davenport, Ia.	1.50*	1.50*	1.50*	1.50*	.....	.....
Dundas, Ont.	.65	1.20	1.20	1.20	1.00	1.00
Eden and Knowles, Wis.	1.00	1.00	1.00	1.00	1.00	.....
Elmhurst, Ill.	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25	1.00@1.25
Greencastle, Ind.	1.00@1.50	1.25	1.10	1.00	1.00	1.00
Hull, Canada	2.50	2.75	2.75	2.25	2.00	1.75
Illinois, Southern	2.00	1.35	1.35	1.35	1.25	.....
Krause, or Columbia, Ill.	1.30@1.80	1.10@1.40	1.10@1.50	1.10@1.40	1.00@1.20	1.00@1.20
Laumon, Wis.	1.25	1.25	1.25	1.25	1.25	1.25
Lima, Ohio	1.40	1.40	1.40	1.40	1.40	1.40
Mayville, Wis.	.80@1.00	1.00	1.00	1.00	1.00	1.00
Moline, Ill.	1.50—2300 lbs. all sizes					
Montrose, Ia.	1.25	1.15@1.25	1.15@1.25	1.10@1.25	1.10@1.15	.....
Oshkosh, Wis.	1.25 per ton, all sizes					
Ottawa, Ont.	2.50	2.75	.....	2.25	2.00	.....
River Rouge, Mich.	.....	1.25	1.25	1.25	1.25	1.25
Sheboygan, Wis.	1.00 to 1.25 all sizes					
St. Louis, Mo.	.60	1.60	.....	.....	.....	.....
Stolle, Ill.	.....	1.30	1.30	1.30	.....	.....
Stone City, Ia.	.50	.....	1.60	1.50	1.40	.....
Toronto, Canada	1.55	2.10	2.10	2.10	1.90	1.90
SOUTHERN:	These prices include 90c freight					
Brooksville, Fla.	1.00	.....	.....	2.80	.....	.....
Cartersville, Ga.	.....	2.20	2.10	2.00	.....	1.90
El Paso, Tex.	1.00	1.00	1.00	1.00	1.00	1.00
Fort Springs, W. Va.	.90	1.00	1.60	1.75	1.35	.....
Mascot, Tenn.	.....	1.00@1.25	.....	1.50	1.50	.....
Winnfield, La.	.80	2.00	2.00	2.00	1.80	.....
WESTERN:						
Atchison, Kans.	.50	1.80	1.80	1.80	1.70	1.70
Blue Springs and Wymore, Neb.	.20	1.65	1.65	1.55	1.45	1.40
Kansas City, Mo.	1.00	1.60	.....	.....	.....	.....

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Baltimore, Md.	.....	.90	2.75	2.50	2.00	1.75
Bernardsville, N. J.	.....	2.80	2.80	2.60	2.40	.....
Bound Brook, N. J.	1.00@1.25	2.00@2.25	1.80@1.90	1.60@1.80	1.50@1.70	.....
Branford, Conn.	.80	1.50	1.50	1.20	1.10	.....
Birdsboro, Pa.	1.40	1.90	1.80	1.60	1.40	1.40
Castro Pt., Richmond, Cal.	.50*	.....	1.50*	1 50*	1.40*	.....
Dresser Junction, Wis.	.50	1.75	1.75	1 55	1.50	1.50
E. Summit, N. J.	2.00@2.25	2.25@2.50	2.00@2.25	1.75@2.00	1.75@2.00	.....
Glen Mills, Pa.	1.00	1.35	1.70	1.55	1.35	1.35‖
Millington, N. J.	1.80	1.80	1.80	1.60	1.00	.....
New Britain, Conn.	.80	1.30	1.25	1.20	1.00	.....
Westfield, Mass.	.60	1.20	1.10	1.00	.90	.80

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Little Falls, N. Y.—Syenite	.80	1.20	1.40	1.20	1.20	1.20‖
Middlebrook, Mo.—Granite	3.50	.....	1.75	1.75	.....	1.00‡
Portland, Maine—Granite	1.50	.....	.....	1.35	1.25	.....
Roseburg, Ore.	.....	1.50	1.25	1.05	1.00	1.00
Stockbridge, Ga.—Granite	.50	2.00	1.90	1.75	1.75	.....
White Haven, Pa.—Sandstone	.85	1.20	1.40	1.20	1.20	1.20‖
Granite	1.25	.....	1.50	1.50	1.50	.....

*Cubic yard. †Agrl. lime. ‖R. R. ballast. §Flux. ‡Rip-rap. a 3-inch and less.

Agricultural Limestone Wholesale at Plant, per Ton

EASTERN:

Coldwater, N. Y.—Analysis, 56.77% $CaCo_3$, 41.74% $MgCo_3$—80% thru 100 mesh; bulk	3.00
Ppr.	4.50
Chaumont, N. Y.—Analysis: $CaCo_3$, 92 to 98%; $MgCo_3$, 1.51%—(Thru 100 mesh); ppr., 4.00; bulk	2.50
Paper bags	4.00
Grove City, Pa.—Analysis: $CaCo_3$, 94.75%; $MgCo_3$, 1.20%—(70% thru 100 mesh); 80 lb. ppr., 4.60; bulk	3.25
Grove, Md.—90% thru 4 mesh; bulk	3.00
Hillsville, Pa.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 1½%—(80% thru 100 mesh) in 80 lb. ppr. bags, 4.25; bulk	2.75
Jamesville, N. Y.—68% thru 100 mesh; 95% thru 50; 100% thru 20. Sacks, 3.75; bulk	2.25
Lime Kiln, Md.—50% thru 50 mesh; bulk	4.00
Rock Cut, N. Y.—Analysis, $CaCo_3$, 91%; $MgCo_3$, 5%—(90% thru 50 mesh)	2.50
Walford, Pa.—(70% thru 100 mesh; 85% thru 50; 50% thru 50; 100% thru 4); sacked, 4.25; bulk	2.75
West Stockbridge, Mass. — Analysis: Combined carbonate, 95%—33% thru 200 mesh; 66% thru 100; 100% thru 40. Bulk	2.85
Williamsport, Pa. — Analysis, $CaCo_3$, 88-90%; $MgCo_3$, 3-4%—(50% thru 50 mesh); bulk	3.00
Bags	4.50

CENTRAL:

Alton, Ill.—Analysis: $CaCo_3$, 96%; $MgCo_3$, 0.75%—90% thru 100 mesh..	3.00
50% thru 50 mesh	2.00
Bedford, Ind.—(90% thru 10 mesh) Analysis, $CaCo_3$, 98.5%; $MgCo_3$, 0.5%	1.75
Canton, O.—50% thru 100 mesh; bulk	3.00
Bags	4.50
Chicago, Ill.—Analysis, $CaCo_3$, 53.63%; $MgCo_3$, 37.51%—90% thru 50 mesh	1.00
Columbia, Ill., near East St. Louis —(½" down)	1.25@1.80
Ellettsville, Ind.—Analysis, Carbonate, 98%	2.00
Elmhurst, Ill. — (Analysis, $CaCo_3$, 35.73%; $MgCo_3$, 20.69%) 50% thru 50 mesh	1.25
Greencastle, Ind.—(Analysis, $CaCo_3$, 98%) 50% thru 50 mesh	1.75
Howenstein, O.—100% thru 10 mesh; 59% thru 50; 39% thru 100	2.75@3.00
Lannon, Wis.—(90% thru 50 mesh) Analysis, 54%, $CaCo_3$; 44%, $MgCo_3$	2.00
Marble Cliff, O.—(50% thru 100 mesh) Analysis, $CaCo_3$, 86%; $MgCo_3$, 8%..	2,50
Marblehead, O. — (Analysis: $CaCo_3$, 95.33%) 100% thru 100 mesh, sacks, 4.75; bulk	2.75
McCook, Ill.—Analysis, $CaCo_3$, 54.10%; $MgCo_3$, 45.04% — 100% thru ¼" sieve; 78.12% thru No. 10; 53.29% thru No. 20; 38.14% thru No. 30; 26.04% thru No. 50; 16.27% thru 100	.90@1.00
Milltown, Ind.—Analysis, $CaCo_3$, 94%; $MgCo_3$, 3%	1.50
Montrose, Ia.—(90% thru 100 mesh)..	1,25
Mountville, Va.—Analysis, $CaCo_3$, 76.6%; $MgCo_3$, 22.8%—30% thru 100 mesh; 100% thru 20 mesh	4.00
Muskegon, Mich.—(90% thru 50 mesh) Analysis, $CaCo_3$, 53.35%; $MgCo_3$, 43.27%	2.50
Piqua, O.—Analysis: $CaCo_3$, 82.8%; $MgCo_3$, 8.2%; neutralizing power in terms of calcium carbonate, 95.3%—70% thru 100 mesh, bulk	2.50@4.00
Rockford, Ill. — Analysis, $CaCo_3$, 53.75%; $MgCo_3$, 44.35%	1.25
Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ½" mesh) Analysis, $CaCo_3$, 89.61 to 89.91%; $MgCo_3$, 3.82%	2,00

(Continued on next page.)

Agricultural Limestone Wholesale at Plant, per Ton

(Continued from preceding page.)

St. Paul, Ind.—Analysis, $CaCo_3$, 85%; $MgCo_3$, 12%	1.50
Stone City, Ia.—Analysis, $CaCo_3$, 98% (90% thru 50 mesh)	.50
Toledo, O.—Analysis, $CaCo_3$, 52.72%; $MgCo_3$, 43%—(20% thru 100 mesh; 30% thru 50; 80% thru 100; 100% thru 5/32 screen)	1.80
Whitehill, Ill. — Analysis, $CaCo_3$, 96.12%; $MgCo_3$, 2.50%—	
90% thru 50 mesh, bulk	2.00
90% thru 100 mesh	5.00
SOUTHERN:	
Brooksville, Fla.—50% thru 50 mesh	2.80
Cartersville, Ga.—Analysis: 96 to 98% combined carbonates—All thru 10 mesh with all dust in	2.50
Dittlinger, Tex. — Analysis, $CaCo_3$, 99.09%; $MgCo_3$, .04%.	
90% thru 100 mesh	2.00
90% thru 4 mesh	1.00
Grovania, Ga.—Analysis, $CaCo_3$, 95%; $MgCo_3$, none—50% thru 100 mesh	3.25
Hopkinsville, Ky.—Analysis, 94.6 to 98.1% $CaCo_3$—Bulk	2.00
Knoxville, Tenn. (pulverized limestone) (90% thru 100 mesh)	2.50 2.00
Irvington, Ky.—(90% thru 50 mesh)	2.00
Memphis Jct., Ky.—(Analysis, $CaCo_3$, 95.31%; $MgCo_3$, 1.12%) average price	2.00
Mascot, Tenn.—Analysis, $CaCo_3$, 52%; $MgCo_3$, 38%.	
(80% thru 100 mesh)	2.50
(All thru 10 mesh)	2.00
80% thru 200 mesh	3.50
Paper bags, $1.50 extra per ton; burlap, 2.00 extra per ton.	
Maxwell, Va.	2.50
Ocala, Fla.—Analysis, $CaCo_3$, 98%—(75% thru 200 mesh)	4.50
Tyrone, Ky.—Analysis, $CaCo_3$, 93%; $MgCo_3$, 6%—90% thru 4 mesh	2.25
Winnfield, La.—(50% thru 50 mesh)	3.00
WESTERN:	
Cement, Calif.—50% thru 50 mesh	4.00
Colton, Calif.—Analysis: $CaCo_3$, 95%; $MgCo_3$, 1½%; bulk, 2.50; bags	3.50
Fresno, Calif.—(Analysis, $CaCo_3$, 94%; $MgCo_3$, .02%) 50% thru 200 mesh; 90% thru 100; 100% thru 40. Prices for delivery: Sacks, 6.50; bulk Sacks, 10c each.	6.00
Kansas City, Mo., Corrigan Sid'g—50% thru 50 mesh; bulk	1.35

Miscellaneous Sands per Ton at Plant

Silica sand is quoted washed, dried and screened, unless otherwise stated.

GLASS SAND:	
Berkeley Springs, W. Va.	2.10
Special hand selected rock	2.50
Cedarville and South Vineland, N. J.—	
Glass, damp	2.00
Glass, dry	2.50
Gray Summit, Mo.	2.00@2.50
Guion, Ark.—Contracts	1.75
Carlots	2.00
Klondike and Pacific, Mo.:	
Contracts	2.00
Car lots	2.50
Mapleton, Pa.	2.50
Glass, damp	2.00
Massillon, Ohio	3.00
Michigan City, Ind.	.30@ .50
Millington, Ill.	1.75@2.25
Mineral Ridge, O.	2.75
Montoursville, Pa.—Green, washed	2.50@2.75
Oregon, Ill.	1.75@2.00
Ottawa, Ill.—Without contracts	2.00@2.50
Robinson, Md., washed, screened, not dried	2.00
St. Marys, Pa.—Green	2.50
Sands, Elk Co., Pa.—Selected, green	2.50
Thayer, W. Va.—Washed	2.50
Unwashed	2.00
FOUNDRY SAND:	
Albany, N. Y.—Core	1.50@2.25
Molding fine	2.50
Molding coarse	2.50
Brass molding	2.50
Sand blast	2.75@4.00
Allentown, Pa.—Core	1.50@1.75
Molding coarse	1.50
Arenzville, Ill.—Molding fine	1.50
Cleveland, O.—Core	1.00@1.50
Molding fine, molding coarse	1.75@2.25
Brass molding	1.50@2.50
Columbus, O.—Core	2.50
Furnace lining	2.50
Molding fine, steel molding	2.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Ambridge, South Heights, Pa.		1.00		1.00	.80	.80
Attica, N. Y.	.65	.65	.65	.75	.75	.75
Concord Jct., Mass.	1.00	1.00	1.25	1.25	1.25	1.25
Farmingdale, N. J.		.75				1.50
Fishers Station, N. Y.			.65@ .75, all sizes			
Hartford, Conn.	.90		1.25	1.15	1.15	1.15
Morristown, N. J.	.60	.60	1.20	1.00	1.00	
N. Wilbraham, Mass.		.60*	1.25*		.90*	
Pittsburgh, Pa.		1.00	1.25	1.00	.80	.80
Washington, D. C.—Wharves	.75	.75	2.00	1.40	1.20	1.20
Yardsville, N. J.			.50@ .75, all sizes			
CENTRAL:						
Alton, Ill.	.60@ .75	.60@ .75	1.50@4.50	1.30	1.20	1.20
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.75	.75	.75	.75	.75	.75
Barton, Wis.	.85	.80	1.00	.80	.80	.80
Beloit, Wis.			.50 sand, .70 gravel			
Chicago		1.25@1.50	1.10@1.25	1.10@1.25	1.10@1.25	1.10@1.25
Columbus, O.			1.00	1.00	1.00	1.00
Covington, Ind.	.75	.75	.85	.75	.75	.75
Earlestead (near Flint), Mich.	.60	.65		1.20	1.00	.85
Escanaba, Mich.		.90	1.60	1.20	1.00	.90
Ft. Jefferson, Mechanicsb'g, O.	.50@ .60	.50@ .60	.50@ .60	.60@ .70	.60@ .70	.60@ .70
Grand Rapids, Mich.	.70*	.70*	1.35*	1.15*	1.00*	1.00*
Hersey, Mich.	.50	.60	1.10	1.10	1.10	
Indianapolis, Ind.	.60	.60		1.50	.75	.75
Janesville, Wis.	.65	.65		.75		
Mason City, Ia.	.85	.75	1.65	1.60	1.50	1.40
Milwaukee, Wis.	.70	.70	.80	.80	.80	.80
Minneapolis, Minn.	.50	.50	1.75	1.75	1.50	1.50
Oxford, Mich.					.85	
Saginaw, Mich.	1.00	1.10	2.10	1.95	1.95	1.85
		(Includes freight rates .60 to .80 per ton)				
St. Louis, Mo., F. O. B. cars	1.20	1.25	1.50	1.30		1.25
Summit Grove, Ind.	.75					
Terre Haute, Ind.	.75	.75				
Toledo, Ohio			.60, all sizes			
Yorkville, Moronts, Oregon and Ottawa, Ill.	.75	.75	.75	.75	.75	.75
SOUTHERN:						
Knoxville, Tenn.	.85	.85	.85	1.50	1.50	1.25
Lake Weir, Fla.		.60				
Macon, Ga.		.75@1.00				
Memphis, Tenn.		1.25			1.50	
Pine Bluff, Ark.	1.25	.92		Concrete gravel 1.30		
Roseland, La., and Condron, Miss.		.50			1.25	
Thomas, La.	.60					1.75
Valde Rouge, La.		.80				1.25@1.50
Waco, Texas		.70			1.10	1.10
WESTERN:						
Kansas City, Mo.	.60	.60	(Kaw river sand .60 per ton carlots)			
Lincoln, Neb. (on cars)	1.00	1.00	2.10	2.10		1.90
Pueblo, Col.	.80*	.60*		1.50*		
Roseburg, Ore.	1.50	1.00	1.25	1.25	1.00	1.00
San Francisco, Cal.	1.25	1.25	1.50	1.15	1.15	1.15
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
Seattle, Wash.	1.25*	1.25*	2.00*	1.25*		1.25*
Vancouver, Wash.		1.10*		1.30*		1.10*
Yorkville, Ore.	.60	.60@ .75	.70	.60@ .75	.60	.50@ .60

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Boonville, N. Y.	.60	.50@ .65				.65
Burnsside, Conn.	.80*					
Yardville, N. J.		.50@ .75				
York, Pa.		1.00@1.10	(crushed rock sand)			
CENTRAL:						
Attica, Covington, Silverwood, Ind., Palestine, Ill.	.60	.60	.60	.60	.60	.60
Escanaba, Mich.			1.00 cu. yd., all sizes			
Grand Rapids, Mich.	.60			.75		.60
Hersey, Mich.	.40	.50	.60	.60	.60	
Illinois, Northern						.50@ .60
Janesville, Wis.					.55	
Oxford, Mich.					.85	
Rockford, Ill.			Sand and Gravel mixed, .55@.65			
Saginaw, Mich. (Incldg. frt.)	1.40	1.40	1.40	1.40	1.40	1.40
Wabash Valley District, Ind.			.60 for all sizes			
Winona, Minn.			Pit run gravel under 2-in., .70			
Yorkville, Moronts, Oregon and Ottawa, Ill.	.60					
SOUTHERN:						
Albany, Ga.	.70@1.00					
Dudley, Ky. (Crushed Sand)	.95	.90		1.00		
Gravel Siding, Miss.			Mine run 45c per ton			
Knoxville, Tenn.	.90	.90	1.50	1.50	1.50	1.30
Lindsay, Tex.			Ballast pit-run gravel, .50 ton			
Pine Bluff, Ark.			Road gravel .45			
Thomas, La.						.40@ .70
Valde Rouge, La.						.60@ .75
Waco, Texas						.67
WESTERN:						
Pueblo, Col.		.60*	River Run, .60 unscreened			
Roseburg, Ore. (crushed stone)			1.35	1.25	1.15	1.00
Saratoga, San Jose, Calif.		.60@ .75	.60@ .70	.60@ .70	.60@ .70	.60@ .70
Yorkville, Ore.		.40			.40	

* Cubic yard. B Bank. L Lake. || Ballast.

Crushed Slag Wholesale at Plant Per Ton

City or shipping point	Roofing	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:							
Bethlehem and Bmaus, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Buffalo, N. Y.	2.00	.95	.95	.95	.95	.95	.95
Cleveland, Ohio.		.85		1.05	1.05	.95	.95
E. Canaan, Conn.	4.00	1.00	1.50	1.25	1.10	1.10	1.10
Erie, Pa.	1.75	.85@1.00	1.00@1.50		1.00	1.00	1.00
Emporium, Pa.		1.00	1.00		1.00	1.00	1.00
Ensley, Ala.	2.05	.90		.90@1.20	1.00	.90	.85
Hokendaugua and Topton, Pa.	2.50	.85	1.50	.85	.85	.85	.85
Lebanon (Donaghmore), Pa.	2.50	.85	1.50	.85	.85	.85	.85
Philadelphia Dist.	2.50	.75	1.50	.85	.85	.85	.85
Pittsburgh, Pa., Dist.	2.05	1.10	1.50	1.10	1.10	1.10	1.10
Sharpsville, Pa.	1.75	1.00	1.25	1.00	1.00	1.00	1.00
CENTRAL:							
Chicago, Ill.	All sizes, $1.50, F. O. B. Chicago						
Detroit, Mich.	All sizes, 1.65, F. O. B. Detroit						
Ironton and Jackson, O.	2.00	1.25	1.50	1.25	1.25	1.25	1.25
Toledo, O.	All sizes, 2.00, F. O. B. Toledo						
Youngstown, Sharpsville, Hubbard, Leetonia, O.	2.00	1.10	1.50	1.10	1.10	1.10	1.10

Agricultural Lime and Hydrate at Plant Per Ton

	—Agricultural Lime— Bulk	Bags	Per Cent CaO	Per Cent MgO	Agricultural Hydrate Bags
EASTERN:					
Adams, Mass.		7.50@8.00	65		
Apollo, Pa.	3.25		95.14	1.44	
Berkeley, R. I.		14.00	45	15	
Bridgeport, Pa.	7.50@9.00		55	44	9.00@11.00
Cavendish, Vt.	2.50 bbl. in car lots				
Cavetown, Md.	**8.50**				
Cedar Hollow, Devault, Rambo and Swedeland, Pa.	**8.00**	**10.75 grd.**	**58**	**38**	**10.75**
Chippewa, Pa.	5.50@6.00		78.67	1.33	
Farnams, Mass.	5.00	7.50			
Frederick, Md.	7.75		88	5 to 8	10.50
Grove City, Pa.	3.25	4.50	94.75	1.20	10.25
Grove, Md.	8.00				**10.75**
Highgate Springs, Vt.		8.00	85	2	
Hollidaysburg, Pa.	6.50		94.25	.30	
Hyndman, Pa.	5.00	8.50	80.23	2.87	
Lime Bluff, Pa.	**5.00@6.25**		**78.67**	**1.33**	
Lime Kiln, Md.	8.00	10.75			10.75
Lime Ridge, Pa.	5.00@6.25		80.56 to 62.56	3.87 to 1.75	
Mt. Union, Pa.	4.25		94.6		
Newburgh, N. Y.			57	38	8.00
New Castle, Pa.	3.50	4.50	47.6 to 50.4	0.62 to 1.12	
Paxtang, Pa.	5.00		60	12	
Rosedale, N. Y.	8.00		96	5	(Bulk, 6.00)
Sandville, O.					9.00
Steuben, Pa., Dover Plains, N. Y., York, Pa.		7.00@9.50	70		10.75 to 12.00
Union Bridge, Md.	8.50		73	1	10.75
Williamsport, Pa.	5.50	10.00	65 to 80	2 to 4	10.00
Williams Station, Pa.	7.50		60.6	39.1	9.75@10.50
York, Pa.	8.00		90 to 95	2 to 7	10.75
CENTRAL:					
Alton, Ill.	10.90		94.0		
Delaware, O.			61.09	9	9.75
Forest, O.	**7.50**				
Manistique, Mich.		10.00	54 & 95	40 & 1.75	10.00
Marblehead, Ohio			54	16.0	9.75
Mitchell, Ind.	9.00				11.00
Springfield, Ohio			33.62	17.73	9.75
Woodville, Ohio		9.25	46 to 48	30 to 34	10.25
SOUTHERN:					
Blowers, Fla.	5.00	7.25	98.0		
Burns, Tenn.	9.00		96	0.54	12.00
Chippewa, Fla.	5.00		80.0	15.0	
Erin, Tenn.	8.00		97.82	0.12	
Karo, Va.	8.00		97.0	1.26	
Lineton, Va.	8.50		97	1.74	
Lushing, Va.	9.00	11.25	60	15	12.75
Maxwell, Va.	5.00		84	1.75	
Newala, Ala.	**8.50@9.00**		**99.33**		
Ocala, Fla.	**4.00**	**6.00 pulv.**	**98½ (dry basis)**		
Staunton, Va.	7.50		96.48		
WESTERN:					
Bellins, Wash.					12.00
Colton, Calif.	4.50		97	2	15.00
Dittlinger, Texas		9.00@11.00	98.62	0.29	12.50@15.00
Knowles, Wis.	8.00	9.50	55	45	9.50
Lime, Ore.	**15.00**		91.48	0.58	
Oscas Island, Wash.		5.50			16.50
San Francisco, Calif.					15.00
Tehachapi, Cal.	6.00	8.00	96	2	

Miscellaneous Sands per Ton

(Continued from preceding page)

Conneaut, O.—	
Molding fine	2.75@3.00
Molding coarse	2.50@2.75
Eau Claire, Wis.—Core	2.25
Brass molding and sand blast	2.25
Fleetwood, Pa.—Furnace lining	2.25
Franklin, Pa.—Traction	2.25
Brass molding	2.75
Molding fine, steel molding	2.00
Molding, coarse	2.00@2.50
Sand blast	3.50
Core	2.00
Klondike and Gray Summit, Mo.— Molding fine	1.50@2.50
Greenville, Ill.—Molding coarse red	1.60@1.80
Guion, Ark.—Filter	2.50
Hancock, Md.—Core and brass mldg.	1.65
Hellam, Pa.—Core	2.00
Joplin, Mo.—Stone sawing, flint	1.25
Kansas City, Mo.—Missouri River core	.85
Leesburg, Pa.—Core, furnace lining, molding fine and coarse	2.00
Mapleton, Pa.—Molding, fine and core, damp	2.00@2.50
Molding, fine, dry	3.00
Massillon, O.—Steel molding coarse	**2.50**
Molding fine	2.50
Molding coarse	2.50
Traction	2.50
Furnace lining	3.00
Core	2.50
Michigan City, Ind.—Core, bank	.40@ .50
Millington, Ill.—Furnace lining, roofing, stone sawing	1.50@2.00
Core	1.50
Mineral Ridge, O.—Core, molding, sand blast, roofing, brass molding, etc., washed, screened (damp)	2.10
Montoursville, Pa.—Core	1.50@2.00
Molding fine	1.50@2.00
Traction	1.25@1.75
Brass molding	2.00@2.50
Ohio—Various points:	
Iron molding, fine	1.50@2.25
Iron molding, coarse	1.75
Brass molding, minimum	**2.00**
Oregon, Ill.—Core	2.00@2.50
Furnace lining	2.00@2.50
Sand blast	2.75
Ottawa, Ill.—Sand blast	3.00
Core, furnace, steel molding	2.50
Roofing sand, molding coarse	2.50
Stone sawing, traction	2.50
Brass molding	2.00@2.50
Providence, R. I.—Molding fine	2.00
Molding coarse	1.90
Brass molding	2.25
Sand blast	3.00@4.00
Sugar Grove, Ohio—Core (dried and screened)	**2.00**
Traction	**2.00**
Thayers, Pa.—Core and traction	1.75@2.00
Furnace lining, molding	1.25
Utica, Pa.—Core	2.00
Molding coarse, traction	2.50
Brass molding	2.75
Sand blast	3.50
Warwick, O.—Core	2.25
Furnace lining	2.25
Molding fine	2.25
Molding, coarse	2.25
Traction and brass molding	2.25
Wedron, Ill.—Core, (crude silica)	.75@1.00
Furnace lining, molding fine	.75@1.00
West Albany, N. Y.—Molding fine	**1.75@2.25**
Molding coarse	1.50
Brass molding	1.75

Gypsum, per Ton, at Plant

Castalia, O.—Crushed, to cement mills	3.50
Ground, to cement mills	3.50
Land plaster	6.00
Fort Dodge, Ia., bulk	3.50
Garhutt, N. Y.—Land plaster, bags	7.00
Grand Rapids, Mich.—Crushed gypsum	7.00
Ground gypsum rock	9.00
Gypsumville, Man., Can.	3.00
Oakfield, N. Y.	7.00
Sandusky, O.	6.00

Jute sacks, $3.00 extra; paper, $1.00 extra.

Ground Rock Phosphate at Plant, per Ton

Centerville, Tenn.—B. P. L., 60% to 70%; ton, 2240 lbs. Ground rock phosphate (90% thru 100 mesh)	9.00@10.00
Lump rock, 72% to 75%, B. P. L.	6.00@8.50
Centreville, Tenn.—B. P. L., 60%	7.00
B. P. L., 60% to 70%	7.00@9.00
Gordonsburg, Tenn.—B. P. L., 72%; ton, 2240 lbs. Ground 90% thru 100 mesh	8.50
Lump rock	6.00@7.50
Mt. Pleasant, Tenn.—(B. P. L. 68%) 13%	7.00
14%	8.00
Mt. Pleasant, Tenn.—B. P. L., 70%	9.50
Nichols, Fla.—Pebble, B. P. L., 68%	10.00
Wales, Tenn. (95% thru 100 mesh) (guaranteed 14% phosphorus equivalent)	8.25
Walls, Tenn.—B. P. L., 70.2%— To County Agri. Assns.	7.50
To others	7.75

Florida Soft Phosphate

Croon, Fla.—Ground pebble, 30%	16.00
Pulverized soft, 26%	17.50
Jacksonville (Fla.) District	10.00@12.00
(Add 2.50 for sacks)	
Phoslime, Fla. (in burlap bags, 100-200 lbs.)	15.00

Passed By The Screens

Incorporations

The Simbroco Stone Co., Boston, Mass., has been incorporated with $500,000 capital.

The Garfield Rock Asphalt Co., Wilmington, Del., has been incorporated under the laws of Delaware, with a capital of $1,250,000.

The Dania Portland Cement Co., chartered at Dania, Fla., with a capital stock of $200,000, will soon begin erecting a plant at that place.

The Waukesha Washed Sand Co., Milwaukee, has increased its stock from $60,000 to $100,000. This includes $60,000 common stock and $40,000 preferred stock.

The Standard Art Stone Co., with headquarters in Portland, Oregon, has been incorporated by R. Nitschke, Oswald Andrae and Theodore Schmidt. The capital stock is $5,000.

The Westfield Marble Co., Westfield, Mass., has been incorporated with a capital of $700,000. The directors are W. A. Murray, president; A. E. McBrien, treasurer, and A. J. Smith.

The Arkansas Fullers Earth Refining Co., has been incorporated with a capital of $500,000. The incorporators are T. L. Croteau, P. B. Drew and C. H. Blaske, all of Wilmington, Del.

The Alabama Lime Works, Fort Payne, Okla., has been incorporated, with J. J. Farnsworth, president and manager; $20,000 worth of equipment, including four lime kilns will be installed.

The Fayette Sand & Gravel Co., Washington, Ohio, has been incorporated with a capital of $25,000. The general manager is G. D. Baker. Other incorporators are G. A. Hyer, H. C. Hosier, and F. W. Jacobs.

The Texarkana Gravel Co., of Texarkana, Tex., has been incorporated under the laws of the state of Texas to operate a gravel plant. The capital stock is $50,000. The incorporators are: W. T. Hays, Harry Wiley and A. E. Rushing.

The Wauhatchie Limestone Co., Knoxville, Tenn., has been incorporated under the laws of Tennessee, with a capital of $100,000. The incorporators are: Alex Harris, C. M. Seymour, T. G. McConnell, A. L. Mason and W. T. Kolter.

Caslani Brothers, Inc., Barre, Vt., has been incorporated under the laws of the state of Vermont, for the purpose of general granite cutting and quarrying. The capital stock is $5,000. The incorporators are Frank Caslani, Josephine Caslani and Leopoldo Tomborini, of Barre, Vt.

The Royal Granite Co., St. Cloud, Minn., has been incorporated to do quarrying of granite and to manufacturer same into rock products. The capital is $50,000 and the incorporators are Wm. Wagner, president; John Lukemeyer, vice president; W. J. Bohner, Vice President, and Hugo Freeburg, secretary and treasurer.

The International Cement Corp., Portland, Me., has been incorporated under the laws of the state of Maine, for the purpose of mining raw material and manufacturing cement. The capital is $2,000,000, and the incorporators are: President, R. L. Johnson; treasurer, H. J. Smith, and clerk, A. B. Farnham.

The Limestone Products Corp. of America has taken over a tract of 45 acres of limestone at Sparta Junction, Sussex County, N. J., and expect to begin the production of limestone for agricultural and commercial purposes. The officers of the company are: President, E. S. Bixler of Easton; vice-president, W. H. Morrow of Belvidere; secretary and treasurer, W. E. Horne of Eaton, N. J. Mr. Bixler and Mr. Horne were formerly connected with the Edison Portland Cement Co. plant at New Village, N. J.

The Youngstown Silica Sand & Products Co., Youngstown, Pa., has been incorporated for the purpose of developing a deposit of silica sand. The tract, which is on the Pennsylvania railroad, four miles south of Mercer, Pa., contains 119 acres of sand. A contour survey of the tract is now being made and machinery to remove the deposit is being designed by R. C. Krause, in the engineering department of the Carnegie Steel Corp. The capital stock is $200,000. The directors are: R. T. Miller, G. E. Burke, R. E. Holway, J. R. Riley, T. M. McEsbeck.

Cement

The Missouri Portland Cement Co., main offices in St. Louis, Mo., is to build, at its Memphis, Tenn., sales headquarters, a new concrete and tile warehouse, which will cost $7,500.

The Giant Portland Cement Co., Philadelphia, Pa., has declared a 3½ per cent dividend on the preferred stock. This is the first dividend on this stock which is cumulative at the rate of 7 per cent per annum, since July 1, 1916.

The Petoskey Portland Cement Co., has made T. B. John of Newaygo, Mich., manager of the new company which will build a plant at Petoskey, Mich., this winter. A. B. Klise and K. C. Buckbee, who will have charge of the construction, have recently been in Milwaukee to arrange for purchase of the machinery.

The Syracuse Cement Co., after drilling for several months, has located a deposit of limestone 400 feet below the ground near its plant north of Lake Wawasee, Ind. The company is now sinking a shaft and intends to manufacture cement out of limestone. For many years it has been making cement from marl taken out of Lake Wawasee.

The Alpha Portland Cement Co., Nazareth Cement Co., Coplay Cement Manufacturing Co., Whitehall Cement Manufacturing Co., and **Penn-Allen Cement Co.**, are suing the **Lehigh Valley Light & Power Co.**, successor to **Lehigh Navigation Electric Co., at Tauto, Pa.**, which supplies power to a number of industries in eastern Pennsylvania, including the above cement companies, on the ground of unjust and unreasonable increase in rates, effective October 15, 1919, and averring that such increase is in violation of contract entered into between the parties. Mr. S. Z. Mitchell, president of the Bond & Share Co., and chairman Board of Directors Lehigh Power Securities Co., who took the stand for the power company, claims that the increase in rates was necessary to attract investors to the financing of this public utility, inasmuch as the increased cost of coal and labor is preventing the company from earning sufficient on its investment to attract more capital.

Quarries

The Storb Crushed Stone Co. crushing plant at Pine Forge, Pa., has been completely destroyed by fire, with a loss to the company aggregating $30,000. Only a part of this was covered by insurance. The quarry had a daily output, before the fire, of 1,000 tons. It is stated that the work of rebuilding will be started immediately, so that as little time as possible will be lost.

The Pittsburgh Manganese Corporation, incorporated under the laws of Virginia, owns all free surface and mineral rights on 188 acres near Compton, Va. The holding is well situated and according to reports, the development is so far progressed as to make certain a large deposit of very valuable ore. A movement is now under foot to raise $120,000 of the $300,000 authorized stock to supply equipment, and to make a payment on the property. The officers and directors of the company are Max Bruening, president; S. M. Houston, vice-president; S. M. Bauersmith, secretary; J. H. Morrow, treasurer; A. A. Wilson, T. R. Schneider and A. J. Smidt. The company's offices are at Luray, Va., and Pittsburgh, Pa.

Personals

S. C. Haines has received an appointment as salesman with the Allied Belting Co., Toledo, Ohio. The Allied Belting Co. is owned by the Greenville Gravel Co., of Greenville, Ohio.

J. J. Moore, who has been actively engaged in the sale of building material since 1910, with the exception of the period spent with the U. S. army, has joined the sales forces of the Beaver Board Companies, New York City.

OBITUARY

C. K. Blackwood, who for the past 17 years has been an important factor in the progress and development of the Sullivan Machinery Co., Chicago, died on Dec. 14, 1919. At that time Mr. Blackwood was holding the offices of vice-president, assistant treasurer and a director of the company.

D. S. Cook, until recently superintendent of the plant of the Louisville Cement Co., at Speeds, Ind., fell dead as he was leaving the wash room of the Hotel Henry Watterson, Louisville, Ky. Mr. Cook, who was 62 years old, entered the employment of the Louisville Cement Co. when he was 14 years old, and had been with the company constantly with the exception of two years, when he was an engineer for the Louisville, Henderson and St. Louis railroad.

G. G. Knott, assistant superintendent of the Superior Portland Cement Co., Concrete, Wash., was instantly killed on Nov. 10, while instructing a shift foreman how to replace a belt that had slipped off the pulley. His raincoat was caught between the belt and the pulley on a Hercules mill, pulling him in between the two and crushing his body. Mr. Knott had been with the company for nine years, working up from electrician to the position he occupied at the time of his death. He leaves a wife and 9-year-old daughter.

John L. Wheat, one of the best known cement men in the central west, died at the age of 86 years, at his home in Louisville, following a lingering illness, having retired last year. Mr. Wheat for many years was in the wholesale grocery business, and later was president of the Union Lime & Cement Co. That company for many years had a big cement mill in Southern Indiana, producing natural cement, and affiliated with the old Western Cement Association, which went through many big fights. In the latter years of the company it handled a jobbing business, and for a time handled a full line of building supplies, with fine show rooms at the Main street house, and also in the Starks building, adjoining the Engineers' & Architects' Club.

Lime

The Alabama Lime Works, Fort Payne, Ala., is constructing a $20,000 lime plant, which will have four kilns. The building proper will be of galvanized iron and 50x120 ft. in dimensions. The capacity will be 45 tons of lime per day.

Sand and Gravel

The Clear Sand and Gravel Co., Wilmington, N. Y., will be the new name of the Dolan Manufacturing Co.

The Detroit Limestone Corp., Detroit, Mich., has been incorporated under the laws of the state of Michigan, with a capital of $4,000. The incorporators are: J. W. Smart, E. C. Smith and R. S. Rush.

The Minnesota Gravel Co., Springfield, Minn., has been incorporated under the laws of the state of Minnesota, to own and operate a sand and gravel plant. The capital stock is $30,000. The president is A. O. Ochs, W. A. Ochs is secretary and treasurer, and J. A. Ochs is also a director.

The Farmers' Co-operative Limestone Co., Branchville, N. J., has been incorporated under the laws of New Jersey to operate a pulverizing agricultural limestone plant. The capital stock is $10.000, and is owned by farmers exclusively. The plant capacity is 30 tons per day, which it is stated is being sold to stockholders at $2.80 per ton. The price to outsiders is $3.00 per ton.

The Columbus Sand & Gravel Co., Columbus, Ohio, through arrangements made by the city council, will dredge the Scioto River between its confluence with the Olentangy River and the old state dam, located at the foot of Main St. The work is to be done after the flood protection work is completed. The Columbus Sand & Gravel Co. is now taking care of gravel dredged by the W. E. Callahan Construction Co. Two acres of city property on the east side of the river at Spring St. will be used as a base for the dredging company and the considerable machinery which it is installing.

CLASSIFIED ADVERTISING

Rates for advertising in the Classified Department: 2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

Plants For Sale

FOR SALE

Sand and Gravel Plant; including Huennekes System Sand Lime Brick Factory, complete; Lime Kiln; unlimited amount of Materials—favorable location for Crusher. Exclusive territory for output. Operating. Address

G. N. Wyckoff, Dudley, Ky.

FOR SALE

Crusher Stone Property for sale in Southern Indiana. Plenty of stone. Good siding connections on good railroad. A Number 5 crushing plant with limestone grinder, and fine prospects for 1920 business. Good reasons for selling. Address

Box 1350 **Care of Rock Products**

Laboratories

TESTING LABORATORIES

Guarantee your agricultural LIME and LIMESTONE by our chemical and screen tests. Have us determine the ACIDITY of your prospects' soils.

Guarantee your PULVERIZERS by our screen tests. Have us determine the calcium CARBONATE equivalents of your prospects' limestone.

Chemically pure reagents and neutral distilled water used.

Investigate our sales service and our personal sales letters directly to your prospects

SOIL AND LIMESTONE TESTING LABORATORY
C. A. Richards, Director
North Vernon, Indiana

Help Wanted

Dynamite and Drill Foreman Wanted

For crushed granite operation. Permanent position. Constant operation. Do not apply unless you send references as to ability and character, and unless you are an expert in laying out and shooting shots in hard granite or trap for crushers. Will pay expenses of right man here for conference.

THE WESTON & BROOKER CO.
Columbia, S. C.

WANTED

Superintendent for large wash sand and gravel plant, one who is competent for production, mechanical ability for supervision, maintenance, and continuous production. Address

Box 1348 **Care of Rock Products**

WANTED

Superintendent of proven executive ability to take charge of large electrically operated quarry and sand plant, generating own power with B. & W. water tube boilers. Must understand piston and centrifugal pumps. Operation continuous throughout the year. Address

Box 1349 **Care of Rock Products**

WANTED

Man to take charge of new gravel pit; familiar with the handling of crude oil engines and 8-inch centrifugal pump. Address

Box 1355 **Care of Rock Products**

Help Wanted

WANTED

A superintendent to take charge of a large crushing plant in Illinois. Must be up to date and a little ahead. State age, experience and salary expected. Address

Box 1354 **Care of Rock Products**

Situation Wanted

POSITION WANTED

as superintendent. Have had twenty years' experience in sand and gravel washing plants, handling centrifugal pumps and all kinds of machinery. Can furnish best of references as to ability.

Box 1352 **Care of Rock Products**

SITUATION WANTED

Superintendent desires engagement where thorough knowledge of operation is essential for economical production; thorough knowledge of heavy blasting and efficient upkeep of machinery. References. Address

Box 1351 **Care of Rock Products**

Partners Wanted

PARTNER WANTED

to help finance a large Washed Sand and Gravel Plant. Good market guaranteed. Two hard roads will be built this year. Good railroad rates and facilities.

Box 1353 **Care of Rock Products**

For prompt and satisfactory results in buying or selling a plant, securing help or a position, use the Classified Department of ROCK PRODUCTS

USED EQUIPMENT

Rates for advertising in the Used Equipment Department: $2.50 per column inch per insertion. Minimum charge, $2.50. Please send check with your order. These ads must be paid in advance of insertion.

FOR SALE

150—Elevator buckets, ten gauge steel 24" x10"x13½" for 26" elevator. These buckets are warranted to be in first class second-hand condition and are offered for sale because no longer needed, our method of elevating material having been changed to belt conveyor.

THE CARMICHAEL GRAVEL COMPANY
Williamsport, Ind. St. Louis, Mo.

FOR SALE

One J. R. Alsing Co.'s No. 6 Cylinder equipped for either wet or dry grinding. Lined with vitreous porcelain. Will grind a charge equal in volume to 120 pounds of sand. Has been used but very little. Will sell cheap. It was purchased for experimental purposes which are now completed.

The Orford Soap Co., Manchester, Conn.

FOR SALE

20—Crushers, Nos. 2 to 10, mostly Gates.
2—327 HP. W. T. boilers, 180 lbs. $9.50 HP.
9—150 HP. 125 lb. H.R.T. boilers, butt strap.
1—No. 10K Gates Manganese fitted crusher.
1—No. 4 crushing plant, motor drive.
1—No. 3 crushing plant, engine drive.
2—48"x12' Taylor Manganese screens.
25—Air compressors, 60 to 4000 cu. ft.
50—Steam engines, 30 to 1500 HP.
75—Steam and Centrifugal pumps.
1—30-60 HP. Emerson-Brantingham tractor.
1—30 HP. and 1—95 HP. Internally fired boilers.
Send us your inquiries for electrical equip., engines, hoists.

Ross Power Equipment Co.
Indianapolis, Ind.

New—RAILS—Relaying

All sections on hand for quick shipment. Reasonable prices quoted. Our stock is very complete.

M. K. FRANK
Frick Building Pittsburgh, Pa.

FOR SALE

40 ton Baldwin S. G. 4 wh. switcher (Ills.)
15 ton Baldwin 36" ga. saddle tank (Ills.)
12 ton Porter 36" ga. saddle tank (Kans.)
18 ton Davenport 48" ga. saddle tank (Ills.)
14 ton Shay geared 36" ga. (Tenn.)
7½ ton Whitcomb E. 36" ga. gasoline (Mich.)
51 E. Marion electric traction shovel, 1¾ yd.
1—1 yd. Keisler type clam shell.
2—2 yd. Owen H. clam shells.
1—7 ton Superior stone grapple.
1—7½ Austin gyratory crusher.
2—7½ Kennedy gyratory crushers.
2—48" Symons disc crushers.

A. V. KONSBERG, 226 So. LaSalle St., Chicago

Repaired Contractors' Equipment

Steam Shovels

Model 60 Marion Shovels, 2½-yard dippers, Nos. 1999, 2059

Locomotives

1—14 x 20" standard gauge saddle tank Locomotive.

2—American 10 x 16" Locomotives, 36" gauge, with butt joint boilers

4—18-ton 10 x 16" Dinkeys, 36" gauge

Cableway

1—Lidgerwood Cableway, 1164-ft. span, with 9 x 10" DC Reversible Link Motion Cableway Engine, 3-ton capacity

We have a large stock of thoroughly repaired Construction Equipment of all kinds ready for immediate shipment.

Clam Shell Buckets

1—1-yard type "E" Blaw

1—1½-yard Browning.

Cars

20—12-yard Western Air Dump, standard gauge, 26 ft. bed.

26—12-yard Western air-dump standard gauge cars, 19' bed.

Hoisting Engines

1—8½ x 10 DC 2-D Lambert, with boiler

1—6 x 10" DC 2-D Byers.

1—6¼ x 10 DC 2-D Mundy, with attached swinger and boiler

H. KLEINHANS COMPANY

Union Arcade **Pittsburgh, Pa.**

Saying, "I saw it in ROCK PRODUCTS," will bring quick action

Buyers' Guide of the Rock Products Industry

AIR COMPRESSORS
Worthington Pump & Mach. Co., New York City.

BAGS AND BAG MACHINERY
Bates Valve Bag Co., Chicago, Ill.
Jaite Company, The, Jaite, Ohio.
Urschel-Bates Valve Bag Co., Toledo, Ohio.

BELTING
Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.
Goodyear Tire & Rubber Co., Akron, O.
Main Belting Co., Philadelphia, Pa.
New York Belting & Packing Co., New York City.

BIN GATES
Beaumont Mfg. Co., Philadelphia, Pa.

BINS, STORAGE
Weller Mfg. Co., Chicago, Ill.

BLASTING SUPPLIES
Aetna Explosives Co., N. Y. City
Atlas Powder Co., Philadelphia, Pa.

BUCKETS, ELEVATOR
Hendrick Mfg. Co., Carbondale, Pa.
Link-Belt Co., Chicago, Ill.
Stephens-Adamson Mfg. Co., Aurora, Ill.

BUCKETS
Advance Eng. Co., Cleveland, O.
Browning Co., Cleveland, Ohio.
Bucyrus Co., The, S. Milwaukee, Wis.
Link-Belt Co., Chicago, Ill.
Marion Steam Shovel Co., Marion, Ohio.
McMyler Interstate Co., Cleveland, Ohio.
Owen Bucket Co., Cleveland, Ohio.

CALCINING MACHINERY
Atlas Car & Mfg. Co., Cleveland, Ohio.
Butterworth & Lowe, Grand Rapids, Mich.

CAR REPLACERS
Track Equipment Co., Huntington, W. Va.

CHAINS AND TRANSMITTING MACHINERY
Link-Belt Co., Chicago, Ill.
Stephens-Adamson Mfg. Co., Aurora, Ill.

CLAY PRODUCTS
Robinson Clay Product Co., The, Akron, Ohio.

CONVEYORS AND ELEVATORS
Caldwell, H. W., & Son Co., Chicago, Ill.
Gifford-Wood Co., Hudson, N. Y.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago, Ill.
Portable Machinery Co., Passaic, N. J.
Robins Conveying Belt Co., New York City.
Smith Eng. Works, Milwaukee, Wis.
Stephens-Adamson Mfg. Co., Aurora, Ill.
The Stevenson Co., Wellsville, Ohio.
Sturtevant Mill Co., Boston, Mass.
Universal Road Mach. Co., Kingston, N. Y.
Webster Mfg. Co., Tiffin, Ohio.
Weller Mfg. Co., Chicago, Ill.

CRANES
Locomotive Gantry

Advance Eng. Co., Cleveland, O.
Ball Engine Co., Erie, Pa.
Browning Co., Cleveland, Ohio.
Byers Mach. Co., John F., Ravenna, Ohio
Chisholm-Moore Mfg. Co., Cleveland, Ohio.
McMyler-Interstate Co., Cleveland, Ohio.
Link-Belt Co., Chicago, Ill.
Ohio Locomotive Crane Co., Bucyrus, Ohio.
Osgood Co., The, Marion, Ohio.

CRUSHERS AND PULVERIZERS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulverizer Co., St. Louis, Mo.
Austin Mfg. Co., Chicago, Ill.
Bacon, Earle C., Inc., New York City.
Beaumont Mfg. Co., Philadelphia, Pa.
Buchanan Co., Inc., C. G., New York City.
Bradley Pulverizer Co., Allentown, Pa.
Butterworth & Lowe, Grand Rapids, Mich.
Chalmers & Williams, Chicago Heights, Ill.
Fuller-Lehigh Co., Fullerton, Pa.
Jeffrey Mfg. Co., The, Columbus, Ohio.
K. B. Pulverizer Co., New York City.
Kennedy-Van Saun Mfg. & Eng. Corp., New York City.
Kent Mill Co., Brooklyn, N. Y.
Lewistown Fdry. & Mach. Co., Lewistown, Pa.
McLanahan-Stone Mach. Co., Hollidaysburg, Pa.
Pennsylvania Crusher Co., Philadelphia, Pa.
Raymond Bros. Impact Pulverizer Co., Chicago, Ill.
Smidth & Co., F. L., New York City.
Smith Eng. Works, Milwaukee, Wis.
The Stevenson Co., Wellsville, Ohio.
Sturtevant Mill Co., Boston, Mass.
Traylor Eng. & Mfg. Co., Allentown, Pa.
Universal Crusher Co., Cedar Rapids, Iowa.
Universal Road Mach. Co., Kingston, N. Y.
Webb City & Carterville F. & M. Works, Webb City, Mo.
Williams Pat. Crush. & Pulv. Co., Chicago, Ill.
Worthington Pump & Mach. Corp., New York City

DERRICKS
American Hoist & Derrick Co., St. Paul, Minn.

DRILLS
Sanderson Cyclone Drill Co., Orrville, Ohio.

DRYERS
American Process Co., New York City.
Ruggles-Coles Eng. Co., N. Y. City.
Vulcan Iron Works, Wilkes-Barre, Pa.

ENGINES, OIL & GAS
American Hoist & Derrick Co., St. Paul, Minn.
Worthington Pump & Mach. Co., New York City.

ENGINES, STEAM
Morris Mach. Works, Baldwinsville, N. Y.

ENGINEERS
Arnold & Weigel, Woodville, Ohio.
Bacon, Earle C., Inc., New York City.
Bradley Pulv. Co., Allentown, Pa.
Buckbee Co., J. C., Chicago, Ill.
Fuller Engineering Co., Allentown, Pa.
Smidth & Co., F. L., New York City.
Schaffer Eng. & Equip. Co., Pittsburgh, Pa.
Yates, Preston K., New York City.

EXCAVATORS
Ball Engine Co., Erie, Pa.
Bucyrus Company, Milwaukee, Wis.
Link-Belt Co., Chicago, Ill.
Marion Steam Shovel Co., Marion, Ind.

EXCAVATORS
Dragline Cableway

Sauerman Bros., Chicago, Ill.

FIRE BRICK
Robinson Clay Product Co., The, Akron, Ohio.

FUSES
Ensign-Bickford Co., Simsbury, Conn.

GAS PRODUCERS
Chapman Eng. Co., Mt. Vernon, Ohio.
International Clay Mach. Co., Dayton, Ohio.

GEARS
Caldwell, H. W., & Sons Co., Chicago, Ill.
Stephens-Adamson Mfg. Co., Aurora, Ill.

GLASS SAND EQUIPMENT
Lewistown Fdy. & Mach. Co., Lewistown, Pa.

HOISTS
American Hoist & Derrick Co., St. Paul, Minn.
Chisholm-Moore Mfg. Co., Cleveland, Ohio.
Vulcan Iron Works, Wilkes-Barre, Pa.

HOSE
Water, Steam, Air Drill, Pneumatic Tool

Cincinnati Rubber Mfg. Co., Cincinnati, O.
Goodyear Tire & Rubber Co., Akron, O.
N. Y. Belting & Packing Co., New York City.

HYDRATING MACHINERY
Atlas Car & Mfg. Co., Cleveland, Ohio.
Miscampbell, H., Duluth, Minn.
Schaffer Eng. & Equip. Co., Pittsburgh, Pa.

HYDRAULIC DREDGES
Morris Machine Works, Baldwinsville, N. Y.

INDUSTRIAL CARS
Atlas Car & Mfg. Co., Cleveland, Ohio.
International Clay Machine Co., Dayton, Ohio.
Watt Mining Car Wheel Co., Barnesville, Ohio.

LIME KILNS
Arnold & Weigel, Woodville, Ohio.
Steacy-Schmidt Mfg. Co., York, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOADERS AND UNLOADERS
Ball Engine Co., Erie, Pa.
Gifford-Wood Co., Hudson, N. Y.
International Clay Mach. Co., Dayton, O.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Link-Belt Co., Chicago, Ill.
Stephens-Adamson Mfg. Co., Aurora, Ill.

LOCOMOTIVES
Baldwin Locomotive Works, The, Philadelphia, Pa.
Fate-Root-Heath Co., Plymouth, Ohio.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Lima Locomotive Works, New York City.
Porter Co., H. K., Pittsburgh, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Co., Geo. D., Rochelle, Ill.

MANGANESE STEEL
American Mang. Steel Co., Chicago, Ill.

MOTORS, ELECTRIC
Gifford-Wood Co., Hudson, N. Y.

MOTOR TRUCKS
Duplex Truck Co., Lansing, Mich.
Federal Motor Truck Co., Detroit, Mich.
Pierce-Arrow Motor Car Co., Buffalo, N. Y.

PACKING
Sheet, Piston, Superheat, Hydraulic

Cincinnati Rubber Mfg. Co., Cincinnati, O.
Goodyear Tire & Rubber Co., Akron, O.
N. Y. Belting & Packing Co., New York City.

PAINT AND COATINGS
Williams, C. K., & Co., Easton, Pa.

PERFORATED METALS
Chicago Perforating Co., Chicago, Ill.
Cross Eng. Co., Carbondale, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Johnston & Chapman Co., Chicago, Ill.
Nortmann Duffke Co., Milwaukee, Wis.

PLASTER MACHINERY
Butterworth & Lowe, Grand Rapids, Mich.
Ehrsam & Sons Co., J.B., Enterprise, Kan.

PORTABLE CONVEYORS
Stephens-Adamson Mfg. Co., Aurora, Ill.

PORTABLE STONE BINS
Austin Mfg. Co., Chicago, Ill.

PUMPS
American Well Works, Aurora, Ill.
Worthington Pump & Machine Co., N. Y. City.

PUMPS, SAND
American Manganese Steel Co., Chicago, Ill.
K. C. Hay Press & Tractor Co., Kansas City, Mo.
Morris Mach. Works, Baldwinsville, N. Y.

POWER TRANSMITTING MACHINERY
Caldwell, H. W., & Son. Co., Chicago, Ill.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Weller Mfg. Co., Chicago, Ill.

POWDER
Aetna Explosives Co., New York City.
Atlas Powder Co., Philadelphia, Pa.

PULVERIZED FUEL EQUIPMENT
Aero Pulv. Co., New York City.
Bradley Pulv. Co., Allentown, Pa.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.

QUARRY EQUIPMENT
Beaumont Mfg. Co., Philadelphia, Pa.
Bucyrus Co., The, S. Milwaukee, Wis.
Marion Steam Shovel Co., Marion, O.
Universal Road Mach. Co., Kingston, N. Y.

SCRAPERS, DRAG
Sauerman Bros., Chicago, Ill.

SCREENS
Audubon Wire Cloth Co., Audubon, N. J.
Austin Mfg. Co., Chicago, Ill.
Beaumont Mfg. Co., Philadelphia, Pa.
Cross Eng. Co., Carbondale, Pa.
Gifford-Wood Co., Hudson, N. Y.
Hendrick Mfg. Co., Carbondale, Pa.
Jeffrey Mfg. Co., The, Columbus, Ohio.
Johnston & Chapman Co., Chicago, Ill.
Link-Belt Co., Chicago, Ill.
National Engineering Co., Chicago, Ill.
Smith Eng. Works, Milwaukee, Wis.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Stimpson Equip. Co., Salt Lake City, Utah.
Sturtevant Mill Co., Boston, Mass.
Toepfer & Sons Co., W., Milwaukee, Wis.
Universal Road Mach. Co., Kingston, N. Y.

SEPARATORS
National Engineering Co., Chicago, Ill.
Raymond Bros. Impact Pulv. Co., Chicago, Ill.
Sturtevant Mill Co., Boston, Mass.
The Stevenson Co., Wellsville, Ohio.

SEPARATORS, MAGNETIC
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SEWER PIPE
Robinson Clay Product Co., The, Akron, Ohio.

SHEAVES
Mayer-Hasseldiek Mfg. Co., St. Louis, Mo.

SHOVELS
Steam and Electric

Ball Engine Co., Erie, Pa.
Bucyrus Company, Milwaukee, Wis.
Marion Steam Shovel Co., Marion, Ohio.
The Osgood Co., Marion, Ohio.
Victor R. Browning & Co., Cleveland, Ohio.

STONE ELEVATORS
Austin Mfg. Co., Chicago, Ill.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Weller Mfg. Co., Chicago, Ill.

TANK CRAWLERS
Victor R. Browning & Co., Cleveland, Ohio.

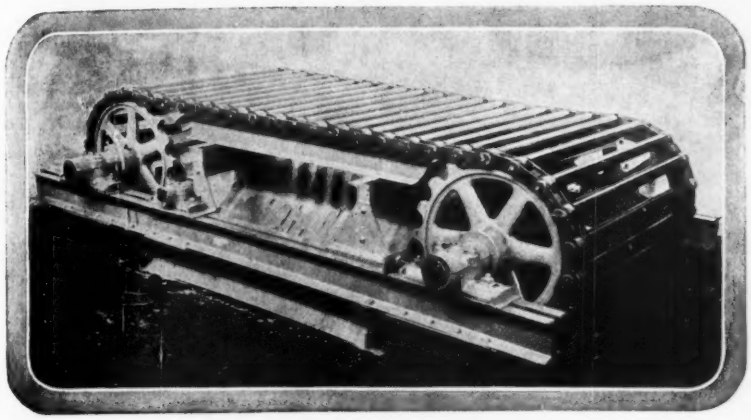
TRACK EQUIPMENT
Central Switch & Frog Co., Cincinnati, Ohio.

VALVES
Goodyear Tire & Rubber Co., Akron, O.

WASHERS, GRAVEL
Smith Eng. Works, Milwaukee, Wis.

WIRE ROPE
American Hoist & Derrick Co., St. Paul, Minn.
American Steel & Wire Co., Chicago, Ill.
Leschen, A., & Sons Co., St. Louis, Mo.
Roebling's Sons Co., John A., Trenton, N. J.
Waterbury Co., New York City.

WIRE CLOTH
Audubon Wire Cloth Co., Audubon, N. J.



S-A FEEDERS

for feeding

belt conveyors
elevators
crushers
screens
etc.

To remove the "fines"

S-A Grizzly Feeders are designed in many styles and in any size. The grizzly bars may be spaced at different intervals to separate a particular sized product.

S-A engineers have a wealth of data on grizzly feeder design

Write for Information and Prices

STEPHENS-ADAMSON MFG. CO., AURORA, ILLINOIS

To Combine Operation of Excavating and Conveying is True Economy

That's Why the Dragline Cableway Excavator System Is Being Installed by So Many Sand and Gravel Producers

Each year sees more Sauerman Dragline Cableway Excavators installed than any preceding year, and the past twelve months has broken all records in this respect.

If you are not already acquainted with the reason for the steady increase in the number of sand and gravel producers using these dragline cableway excavators, just ask yourself this question: "What is more economical than an excavator that not only digs, but also elevates and conveys material any distance up to 500 feet and dumps at any desired point?"

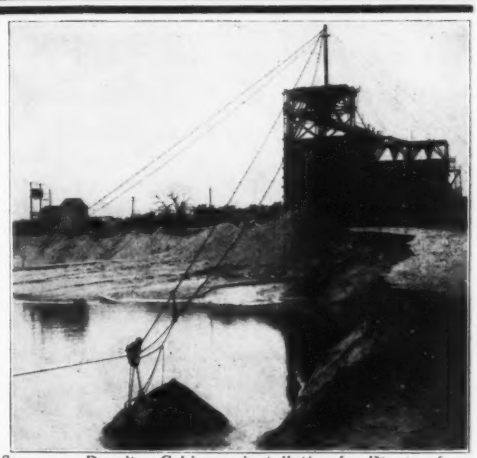
There you have the answer. It is the ability of the dragline cableway excavator to dig over long spans and to depths beyond the reach of a steam shovel or a boom dragline excavator, and particularly its economy and efficiency in handling materials from under water that have influenced so many sand and gravel operators to give preference to this type of equipment.

Sauerman outfits are economical to operate. One man at the levers of a two-drum hoist controls all the operations of digging, conveying, elevating and dumping. After dumping, the bucket returns to the digging point by gravity.

The experience of the Sauerman organization of engineers is at your service if you have a gravel deposit to develop or any similar excavating problem.

Buy your 1920 plant early and insure delivery

Sauerman Bros., 1140 Monadnock Bldg., Chicago



Sauerman Dragline Cableway Installation for Digging from Wet Pit and Conveying Direct to Screens

Method of Operation

The operation of the Sauerman Dragline Cableway Excavator with the track cable taut and the empty bucket near the top of the cableway is as follows: The bucket runs back to digging point by gravity, is lowered into pit by letting out tension line and is loaded, elevated, conveyed and dumped by taking in load and tension lines alternately.